BONNEVILLE POWER ADMINISTRATION

Habitat Evaluation Procedures (HEP) Report

Wanaket Wildlife Area

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WANAKET WILDLIFE AREA

2005 HEP REPORT

February 2006

Confederated Tribes of the Umatilla Indian Reservation
Wildlife Program

Columbia Basin Fish and Wildlife Authority – Regional HEP Team

Bonneville Power Administration

WANAKET WILDLIFE AREA

2005 HEP REPORT

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For

Confederated Tribes of the Umatilla Indian Reservation
Wildlife Program

and

Bonneville Power Administration
Project Number 1990-092-00
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ABSTRACT

The Regional HEP Team (RHT) and Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Wildlife Program staff conducted a follow-up habitat evaluation procedures (HEP) analysis on the Wanaket Wildlife Management Area in June 2005. The 2005 HEP investigation generated 3,084.48 habitat units (HUs) for a net increase of 752.18 HUs above 1990/1995 baseline survey results. The HU to acre ratio also increased from 0.84:1.0 to 1.16:1.0. The largest increase in habitat units occurred in the shrubsteppe/grassland cover type (California quail and western meadowlark models), which increased from 1,544 HUs to 2,777 HUs (+43%), while agriculture cover type HUs were eliminated because agricultural lands (managed pasture) were converted to shrubsteppe/grassland.

In addition to the agriculture cover type, major changes in habitat structure occurred in the shrubsteppe/grassland cover type due to the 2001 wildfire which removed the shrub component from well over 95% of its former range. The number of acres of all other cover types remained relatively stable; however, habitat quality improved in the riparian herb and riparian shrub cover types.

The number and type of HEP species models used during the 2005 HEP analysis were identical to those used in the 1990/1995 baseline HEP surveys. The number of species models employed to evaluate the shrubsteppe/grassland, sand/gravel/mud/cobble, and riparian herb cover types, however, were fewer than reported in the McNary Dam Loss Assessment (Rassmussen and Wright 1989) for the same cover types.

INTRODUCTION

This Habitat Evaluations Procedures (HEP) report is a follow-up to the baseline HEP studies completed in 1990 (Rasmussen et al.1991) and in 1995 (CTUIR, unpublished data). The Regional HEP Team (RHT) conducted the follow-up analysis in June 2005 with assistance from the Confederated Tribes of the Umatilla Reservation Wildlife Program staff. The primary objective of this HEP analysis is to evaluate extant habitat conditions and compare the results to baseline wildlife habitat values reported by Rasmussen and others (1991) and to results from the 1995 revision.

In the original HEP conducted in 1990 by Rasmussen et al., cover types acreages and habitat suitability indices were estimated based on the proposed boundary of the wildlife area, which had not been finalized for mitigation purposes at that time. When acquisition of the property was completed, the final boundary was different than the proposed 1990 project boundary. In 1995, corrected acreages for each cover type were estimated and the 1990 habitat suitability indices were applied to the new acreages values to determine final habitat units for the project area.

STUDY AREA

Location

The 2,765 acre Wanaket Wildlife Area (formerly the Conforth Ranch) is located approximately 2 miles east of Umatilla, Oregon on the south shore of the Columbia River along McNary Reservoir between the Port of Umatilla (River Mile 295) on the west and Hat Rock State Park (River mile 299**)** on the east (Figure 1). The project area (Figure 2) is bisected from west to east by State Highway 730 and borders agricultural lands to the south (Figure 3).

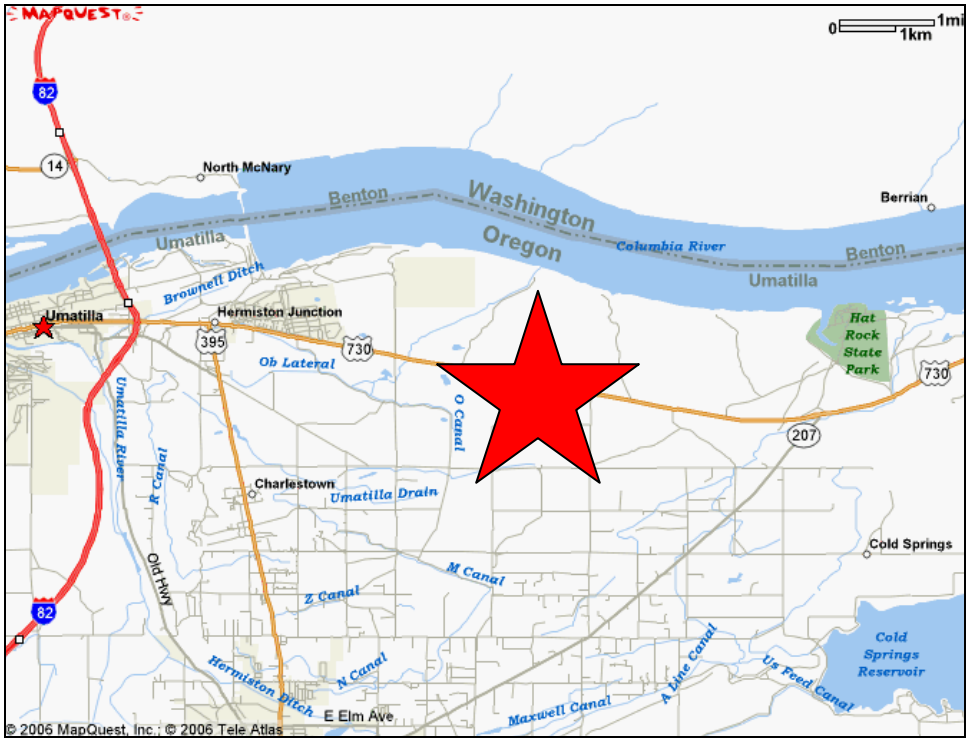

Figure 1. General location of the Wanaket Wildlife Area.

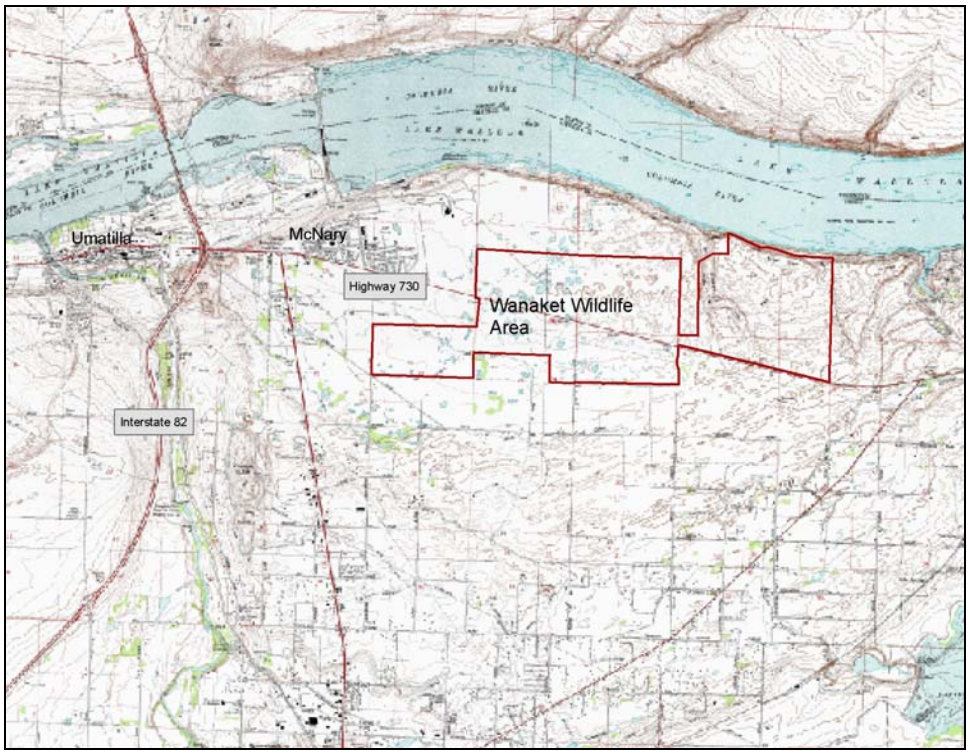

Figure 2. Wanaket Wildlife Area boundary map.

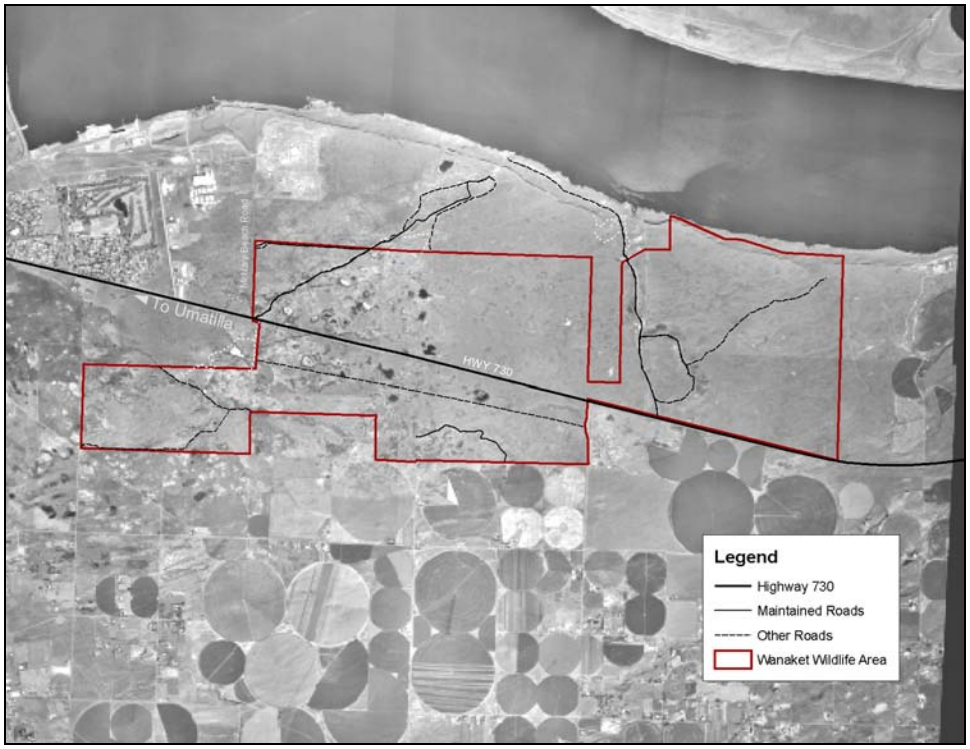

Figure 3. Wanaket Wildlife Area adjacent land use map.

Cover Types

The Wanaket Wildlife Area is comprised of seven cover types including shrubsteppe/grassland, emergent wetland, riparian tree, riparian shrub, riparian herb, sand/gravel/cobble/mud, and developed (J. Barnett, unpublished data). Eight cover types, however, were evaluated in the 1990/1995 HEP analyses, which included the agriculture cover type as shown in Table 1.

Table 1. Current and baseline cover type comparison and summary.

COVER TYPES	2005		1990		CHANGE	
	Acres	Percent	Acres	Percent	Acres	Percent
Shrubsteppe/grass	2,477	90%	1,716	62%	761	28%
Emergent Wetland	159	6%	148	5%	-11	-1%
Riparian Tree	5	0%	5	0%	0	0%
Riparian Shrub	34	1%	30	1%	4	0%
Riparian Herb	35	1%	35	1%	0	0%
Sand/gravel/cobble/mud	25	1%	25	1%	0	0%
Developed	30	1%	30	1%	0	0%
Agriculture	0	0%	776	28%	-776	-28%
Total	**2,765**	**100%**	**2,765**	**100%**	**0**	**0%**

Significant acreage changes occurred in the shrubsteppe and agriculture cover types between 1990 and 2005. The entire agriculture (managed pasture) cover type was converted to shrubsteppe/grassland thus increasing shrubsteppe habitat by 28% or 776 acres, while completely eliminating the agriculture component from the landscape (Figure 4). Minor acreage differences for other cover types noted in Table 1 are likely artifacts resulting from different methods used to estimate cover type acreages in 1990 (Rasmussen et al.1991) and 2005 (J. Barnett, unpublished data).

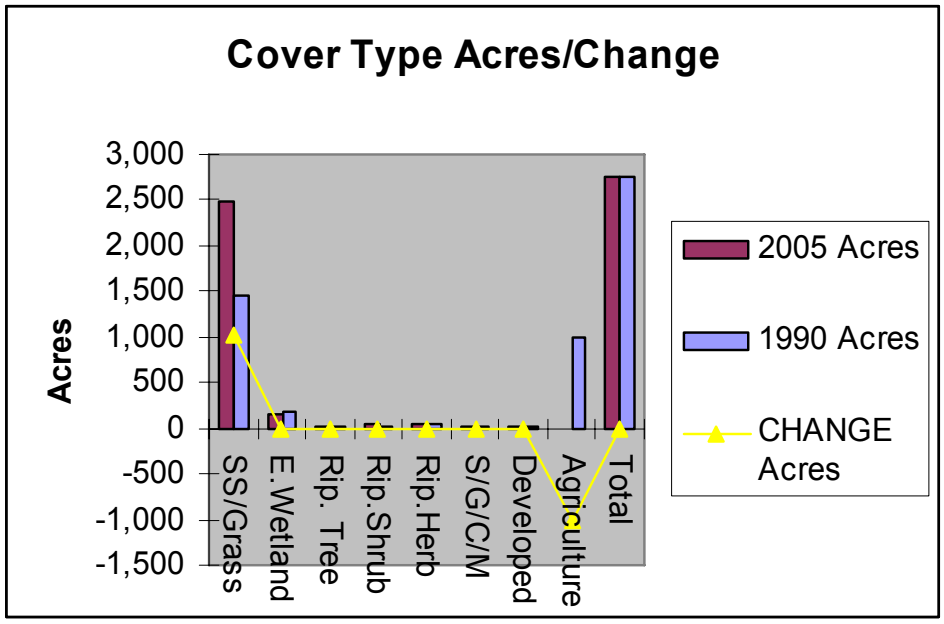

Figure 4. Current and baseline cover type acreage comparison (1990 and 2005).

Final cover type maps are currently not available, but are a CTUIR priority (J. Barnett, pers. comm.). Draft cover type maps and acreage estimates, however, were provided by CTUIR wildlife biologists with various degrees of confidence as shown in Table 2.

Table 2. Estimated cover type acres and confidence level (J. Barnett, pers. comm.).

COVER TYPES	2005	
	Acres	Confidence
Shrubsteppe/grass	2,477	Moderate
Emergent Wetland	159	Moderate
Riparian Tree	5	Low
Riparian Shrub	34	High
Riparian Herb	35	Low
Sand/gravel/cobble/mud	25	Low
Developed	30	Low
Agriculture	0	High
Total	**2,765**	

The Regional HEP team ground-truthed available cover type maps/data prior to establishing transects. A draft example cover type map depicting emergent wetlands located on the west side of the wildlife area is shown in Figure 5.

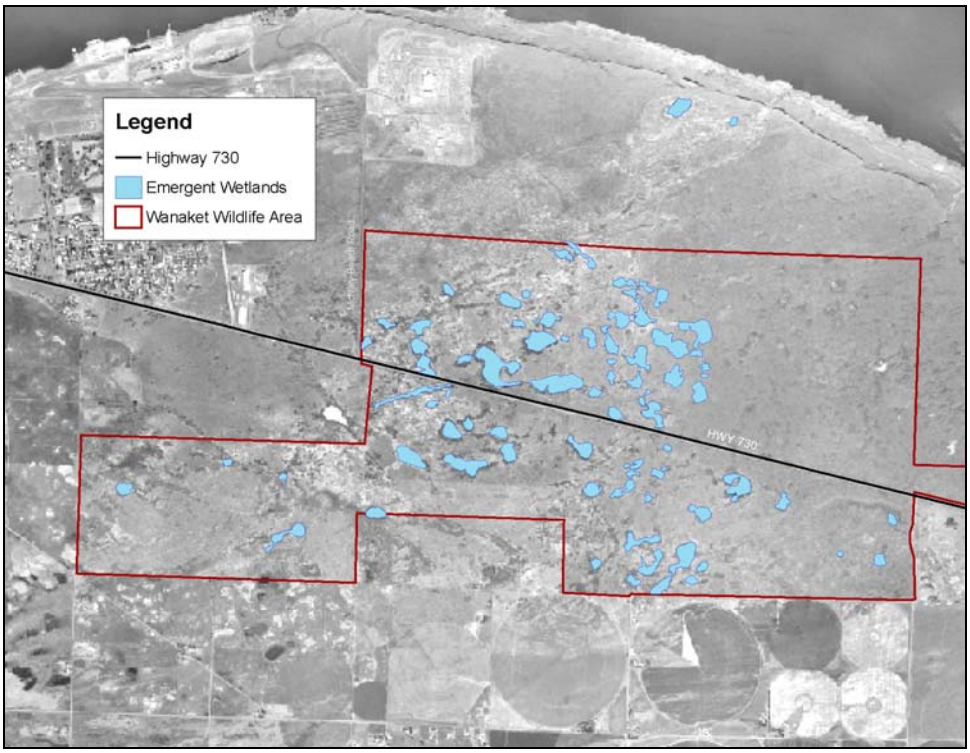

Figure 5. Emergent wetland cover type map example.

Shrubsteppe/Grassland

The combined shrubsteppe/grassland cover type dominates the landscape. Big sagebrush *(Artemisia tridentata)*, once the dominant shrub, is largely absent from the project area due to a wildfire that occurred in 2001, which left 2,457 acres in a grassland condition. Green rabbitbrush *(Chrysothamnus viscidiflorus)* and sagebrush were detected in trace amounts (<0.5%) on the grassland cover type component during the 2005 HEP surveys.

Grassland herbaceous cover is predominantly cheatgrass *(Bromus tectorum)* with lesser amounts of prickly lettuce *(Lactuca serriola),* Sandberg bluegrass *(Poa sandbergii),* knapweed *(Centaurea spp.),* Jim Hill mustard *(Sisymbrium altissimum),* and Russian thistle *(Salsola iberica)* present. The grassland component of the shrubsteppe/grassland cover type is depicted in Figure 6.

Figure 6. Post burn shrubsteppe/grassland habitat.

Shrubsteppe (shrubland component) occurs on only approximately 20 acres at this juncture. Big sagebrush is the dominant shrub (≈ 15% cover) followed by green rabbitbrush (≈ 1.5% cover), bitterbrush *(Purshia tridentata)* (<1% cover), and Russian olive *(Elaeagnus angustifolia)* (<1% cover). Few seedling and juvenile shrubs are present. Shrub age/structure characteristics range primarily from mature to very decadent[1]. Herbaceous cover exceeds 80% and is comprised primarily of cheatgrass and Sandberg bluegrass. The shrubsteppe (shrubland) component is shown in Figure 7.

[1] Shrub age/structure characteristics: **seedling**-monocot; **juvenile**-branched/non-reproducing; **mature**-flowering/producing seeds; **decadent**-25% to 50% of shrub is dead; **very decadent**->50% of the shrub is dead; **dead**-entire shrub is dead.

Figure 7. Intact shrubsteppe habitat.

Emergent Wetland

Emergent wetlands are well defined and occur primarily as "pot holes" resulting from the application of "irrigation" water onto small closed basins (Figure 8). These wetlands range from 0.5 to 5 acres in size. Typical wetland taxa include sedge *(Carex spp.)*, rushes *(Juncus spp.)*, cattail *(Typha latifolia)*, and saltgrass *(Distichlis stricta)*. Weedy herbaceous species occur along the edges of most wetlands.

Figure 8. A typical emergent wetland.

Riparian Tree

This cover type, based on transect results, is comprised of black cottonwood *(Populus trichocarpa)*, willow *(Salix spp.)*, and Russian olive and is associated with wetlands and irrigation ditches (Figure 9). Only 3 stands larger than one acre are present comprising less than 1% (5 acres) of the wildlife area. The riparian tree cover type appears to be an artifact of attempts by previous landowners to establish a tree component on the property (except for the Russian olive component which is an invader species). Although these small fragmented sites do provide some structural diversity, the riparian tree cover type does not function as a riparian forest at the present time.

Figure 9. Riparian tree (forest) cover type.

Riparian Shrub

The riparian shrub cover type is a complex (multi layered) plant community dominated by mature Russian olive trees ranging from 2% to 65% cover depending on the specific site surveyed. Percent cover for Russian olive was <27% on only one site (mean percent cover is 35%, constancy[2] is 100%). Other shrubs and/or small trees present include Bebb willow *(Salix bebbiana*), peachleaf willow *(Salix amygdaloides),* weeping willow *(Salix babylonica),* corkscrew willow *(Salix matsudana),* and eastern cottonwood *(Populus deltoides).* Herbaceous cover is dense except in areas dominated by Russian olive. Russian olive dominated and diverse riparian shrub sites are shown in Figure 10 and Figure 11 respectively.

[2] Constancy is the percent of transects a species of interest occurs within.

Figure 10. Russian olive dominated riparian shrub site example.

Figure 11. Diverse riparian shrub site example.

Riparian Herb

The riparian herb cover type consists of low growing vegetation adjacent to emergent wetlands or in other low areas receiving water seepage. These sites support sedges, rushes, and grasses, including reed canarygrass *(Phalaris arundinacea),* as well as a myriad of weed species such as mullein *(Verbascum thapsus)*. A typical riparian herb site is shown in Figure 12.

Figure 12. A typical riparian herb site.

Sand/Gravel/Cobble/Mud

The sand, gravel, cobble, mud substrate is exposed only after irrigation water is shut off and pond water recedes. This cover type is generally present in the fall and winter for approximately 25% of the year and is managed as migratory shore bird habitat. The Regional HEP Team did not evaluate this cover type in June 2005 (it was inundated); however, the cover type was evaluated by CTUIR staff in the fall after water levels dropped. A photograph of this cover type is currently not available.

Developed

Approximately 30 acres (1%) of the ranch is comprised of old feed lots, outbuildings, and other similar areas relatively void of vegetation. These areas were not evaluated and have little value for wildlife.

METHODS

Habitat Evaluation Procedures

A habitat evaluation procedures analysis was conducted at the Wanaket Wildlife Management Area to document changes in habitat quality relative to 1990 baseline habitat conditions. HEP, developed by the U.S. Fish and Wildlife Service (USFWS), is used to quantify the impacts of development, protection, and restoration projects/measures on terrestrial and aquatic habitats by assessing changes, both negative and positive, in habitat quality and quantity (USFWS 1980), (USFWS 1980a).

HEP is a habitat based approach to impact assessment that documents change through use of a habitat suitability index (HSI). The HSI value is derived from an evaluation of the ability of key habitat components to provide the life requisites of selected wildlife and fish species.

The HSI value is an index to habitat carrying capacity for a specific species or guild of species based on a performance measure (e.g. number of deer per square mile) described in HEP species models. The index ranges from 0.0 to 1.0. A HSI of 0.3 indicates that habitat quality/carrying capacity is marginal while a HSI of 0.7 suggests that habitat quality/carrying capacity is relatively good for a particular species (Table 3).

Table 3. Habitat suitability index verbal equivalancy table.

Habitat Suitability Index	Verbal Equivalent
0.0 < 0.2	Poor
0.2 < 0.4	Marginal
0.4 < 0.6	Fair
0.6 < 0.9	Good
0.9 < 1.0	Optimum

Each increment of change is identical. For example, a change in HSI from 0.1 to 0.2 represents the same magnitude of change as a change from 0.2 to 0.3, and so forth. Habitat variables, suggested mensuration techniques, and mathematical aggregations of assessment results are included in HEP evaluation species models.

HEP Model Selection

HEP model selection was based on habitat types and species models identified in the McNary Dam loss assessment (Rassmussen and Wright 1989) (Table 4) and are identical to those used in the baseline HEP analysis (Figure 5).

Although based on the McNary Dam loss assessment (Rassmussen and Wright 1989), the baseline HEP analysis did not include all HEP species models described in the loss assessment. Most notably the Canada goose model was omitted during the 1990/1995 baseline HEP analyses; because wildlife biologists believed the wildlife area would not support nesting Canada geese due to a lack of island habitat. The 1990 HEP team, however, did agree that with management islands and nesting structure could be easily

established on the existing wetlands and that these areas would become useable by Canada geese for nesting and brood rearing (Rasmussen et al.1991).

In addition, the number of species applied per cover type (HU stacking) on the baseline and subsequently the 2005 HEP analyses were less than what was used in the McNary Dam loss assessment for the shrubsteppe/grass, sand/gravel/cobble/mud, and riparian herb cover types (Table 6). This was discussed with CTUIR wildlife biologists who indicated BPA previously agreed to the "HU stacking" shown in Figure 5 and that the Tribe would negotiate directly with BPA to modify the number of species used in the HEP analyses if required.

HEP Species Models

HEP species selection rationale is summarized below. Only the species used in the HEP analysis are listed. Species models are included in Appendix A ("scanned" abbreviated copies).

1. Spotted sandpiper *(Actictis macularia)*: A representative of migratory shorebirds that utilize sparsely vegetated islands, mudflats, shorelines, and sand and gravel bars.

2. Yellow warbler *(Dendroica petechia)*: Represents species that reproduce in riparian shrub habitat and make extensive use of adjacent wetlands.

3. Mink *(Mustela vison)*: Carnivorous furbearer that utilizes shoreline and adjacent shallow water habitats, feeds on a wide range of vertebrates, and is of cultural significance.

4. Western meadowlark *(Sturnella neglecta)*: A species common to shrubsteppe-grassland habitat that feeds primarily on insects and seeds.

5. California quail *(Lophortyx californicus)*: A species associated with brushy thickets, shrubsteppe-grassland, riparian shrub, and cropland habitats. This introduced game bird feeds primarily on seeds and succulent herbaceous vegetation in somewhat open brushy and grassland areas.
6. Ma1lard *(Anas platyrhynchos)*: The mallard utilizes a broader range of cover types than any other target species. Shrubsteppe-grassland, riparian herb, and island habitats are all used to some degree for nesting. Open water and agricultural areas provide winter resting and feeding while emergent wetlands are necessary for brood rearing.
7. Downy woodpecker *(Picoides pubescens)*: This woodpecker represents species which feed and reproduce in tree environments. Its diet is primarily insects with some seeds and fruits.

Table 4. The McNary Dam habitat loss assessment species/cover type matrix.

McNARY LOSS ASSESSMENT MATRIX								
HEP MODEL	COVER TYPES							
	Shrubsteppe/grass	Islands	Agriculture	Sand/Gravel	Rip. Tree	Rip. Shrub	Emerg. Wetland	Rip. Herb
Canada Goose	X	X	X	X				X
Western Meadowlard	X							
California Quail	X		X			X		X
Mallard	X	X	X				X	X
Sandpiper				X				
Mink				X	X	X	X	X
Woodpecker					X			
Yellow Warbler						X		
TOTAL	4	2	3	3	2	3	2	4

Table 5. Wanaket Wildlife Area HEP species/cover type matrix.

LOSS ASSESSMENT PROJECT: Wanaket (1990/1995 and 2005)								
HEP MODEL	COVER TYPES							
	Shrub/steppe/grass	Islands	Agriculture	Sand/Gravel	Rip. Tree	Rip. Shrub	Emerg. Wetland	Rip. Herb
Canada Goose								
Western Meadowlard	X							
California Quail	X					X		X
Mallard							X	X
Sandpiper				X				
Mink				X	X	X	X	X
Woodpecker					X			
Yellow Warbler						X		
TOTAL	2	N/A	N/A	2	2	3	2	3

Table 6. Differences between McNary Dam species/cover type matrix and theWanaket HEP species/cover type matrix.

Matrices	COVER TYPES							
	Shrub/steppe/grass	Islands	Agriculture	Sand/Gravel	Rip. Tree	Rip. Shrub	Emerg. Wetland	Rip. Herb
McNary Dam	4	2	3	3	2	3	2	4
Wanaket	2	N/A	N/A	2	2	3	2	3
Difference	-2	N/A	N/A	-1	0	0	0	-1

Sampling Design and Measurement Protocols

Pilot studies were conducted to estimate the sample size needed for a 95% confidence level with a 10% tolerable error level (Avery 1994) and to determine the most appropriate sampling unit for the habitat variable of interest i.e., a coefficient of variation analysis (BLM 1998). In addition, a power analysis was conducted on pilot study data (and periodically throughout data collection) to ensure that sample sizes were sufficient to identify a minimal detectable change of 20% in the variable of interest with a Type I error rate ≤ 0.10 and $P = 0.9$ (BLM 1998, Block et al. 2001).

Metrics

1. Herbaceous measurements were recorded at 20 or 25-foot intervals on the right side of the transect tape (the right side is determined by standing at 0 feet and facing the line of travel/transect azimuth). RHT members walked on the left side of the transect line to reduce sample disturbance. A square $0.1m^2$ micro-plot grid was used in grasslands to estimate percent cover of herbaceous vegetation while a rectangular $0.5m^2$ grid was used in shrublands. The near right hand corner of the grid is placed at the sampling interval (rectangle grids are placed with the long axis perpendicular to the tape, and the lower right corner on the sampling interval). Grid samples are considered independent samples for statistical purposes. The Robel pole (Robel 1975) was not used to estimate herbaceous visual obstruction readings (VOR) during this analysis.

2. Herbaceous height was measured with a measuring rod placed within the grid frame (scale = 10ths/inches). Three evenly spaced measurements are recorded and averaged for each sample. Only leaf material is measured (leaves provide the greatest amount of cover). Grass inflorescence is not included in height measurements.

3. Line intercept or point intercept (USFWS 1981) were used to determine shrub cover. Line intercept was used when shrub cover was estimated at < 5% (the most accurate results are obtained using the line intercept method). In contrast, the point intercept method was used if shrub cover was estimated at > 5%.

If shrub canopy cover was estimated at 5% to 20%, point data was collected at two-foot intervals (50 possible "hits" per 100 ft. sample unit). If shrub cover was estimated at >20%, shrub point data was collected at five foot intervals (20 possible "hits" per 100 ft. sample unit). Regardless of method, the sampling unit was a 100-foot segment of the transect for statistical purposes.

Shrub cover was estimated for impenetrable or otherwise inaccessible shrub thickets using a modified point method. A baseline transect was established along the shrub edge. A six-foot measuring rod was then inserted into the shrub cover at a perpendicular angle to the baseline tape at appropriate intervals. Recorders estimated shrub "hits", species information, and height data where the end of the six-foot measuring rod intercepted the shrub cover.

4. Shrub height was measured at the highest point for each line intercept segment or the tallest point at the intercept mark (point intercept). Overlapping shrub canopies were recorded by shrub species as structurally complex shrub communities (rather than simple shrub communities).

5. Shrub density was collected in grasslands to document the occurrence of trace amounts of shrubs (<1% cover). Shrubs were counted within a 0.1 acre belt transect that paralleled the transect line (22 feet on each side of the tape). Each 100 foot sampling unit equaled approximately 0.1 acre.

6. Tree canopy cover measurements were recorded at five or ten foot intervals with a densitometer. Measurement intervals were determined by visually estimating tree canopy closure prior to initiating the survey. If estimated canopy closure was less than 10%, measurements were recorded at five-foot intervals; if estimated greater than 10% canopy closure, ten-foot intervals were used. As with shrubs, the sampling unit is a 100 foot segment of the transect.

7. Snag data was documented on belt transects. RHT members collected snag data in conjunction with tree canopy closure measurements using the same baseline transect. Snags, if present, were detected and recorded within a tenth-acre belt transect paralleling the baseline transect (44 feet wide by 100 feet long i.e., 22 feet on each side of the baseline transect). As with shrubs and trees, the sampling unit is each 100-foot segment.

8. Tree basal area data was collected at 100-foot intervals using a "factor 10" prism. Each 100-foot interval basal area observation (all tree "hits" at each 100-foot point) were considered independent samples.

9. Photo points were established at the start point of each transect. Pictures were recorded from a height of three feet at the beginning of each transect facing the transect azimuth. A reference cover board was placed at the 30 foot mark on each transect. Occasionally, panoramic photographs were also taken. Habitat conditions were photographed with a Canon G1® 3.3 pixal digital camera (with and without magnification) (Appendix B).

Sample Size Determination

The process for determining sample size (transect length) varied based on the variable measured. Shrub and tree cover and grid sample sizes were estimated as follows:

Percent cover within each 100 foot sample unit was divided by sample unit length to obtain percent shrub/tree cover per sample unit (e.g. 10 feet of cover/100 feet = 10% shrub cover). The standard deviation for each transect was calculated for percent cover data from transect sample units. Sample size (transect length) was then determined through use of the following equation (Avery 1994):

$$n = \frac{t^2 s^2}{E^2}$$

Where: t = t value at the 95 percent (0.05) confidence interval for the appropriate degrees of freedom (*df*); s = standard deviation; and E = desired level of precision, or bounds (± 10 percent). The same method was used to determine sample size for grids based on total percent cover for herbaceous species.

Transect Locations

Transect initial points (IPs) were established based on stratified random sampling protocols with cover types defining the strata. In addition, the number of samples initially allocated per cover type strata were determined based on a proportional allocation strategy (Husch et al. 2003). Specific IP locations were established by overlaying a 100m x 100m grid over cover types and selecting random numbers to identify "XY" point coordinates.

The proportional allocation was modified in the field to compensate for the relative homogeneity of the shrubsteppe/grassland cover type. The net result was that a disproportional number of transects, relative to cover type acres, were established within diverse wetland areas. Occasionally, initial points were moved when they did not fall within the cover type(s) of interest, or were in inaccessible areas such as the middle of a pond. IP locations are illustrated in Figure 13.

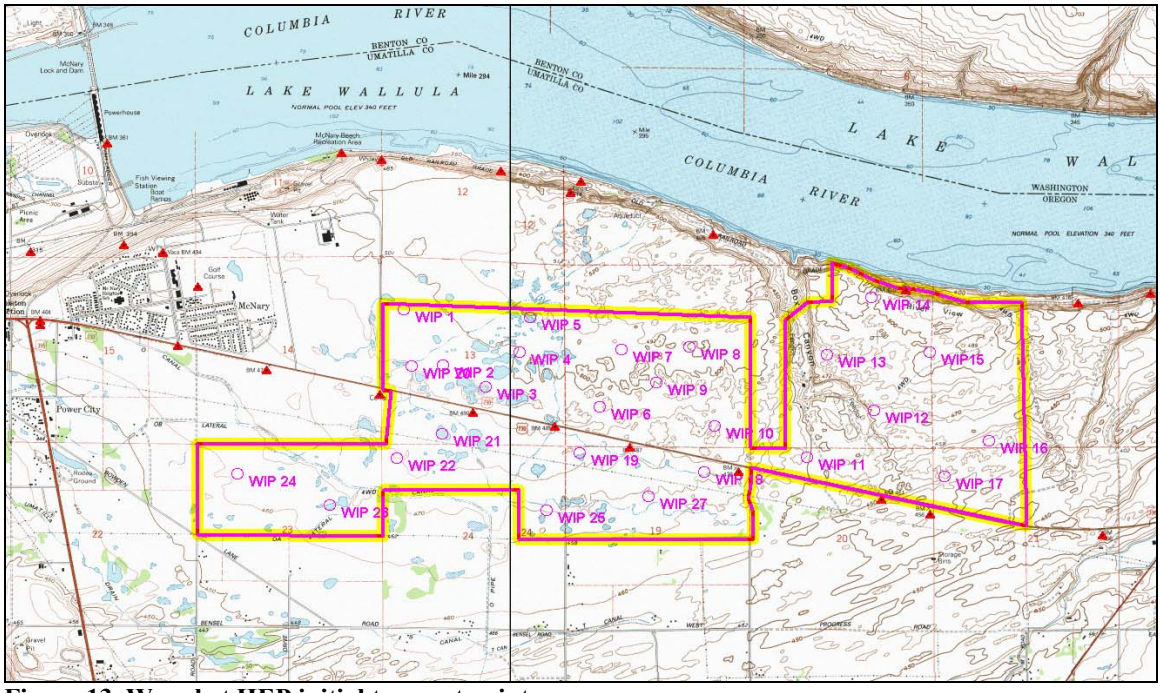

Figure 13. Wanaket HEP initial transect points.

Transect UTM coordinates (NAD 27) for start, turn, and end points were recorded on a Garmin IIIA ® GPS unit. Transect azimuths were reported as magnetic bearings. Actual transect start point locations are shown in Figure 14 and Figure 15 while transect coordinates are summarized in Table 7.

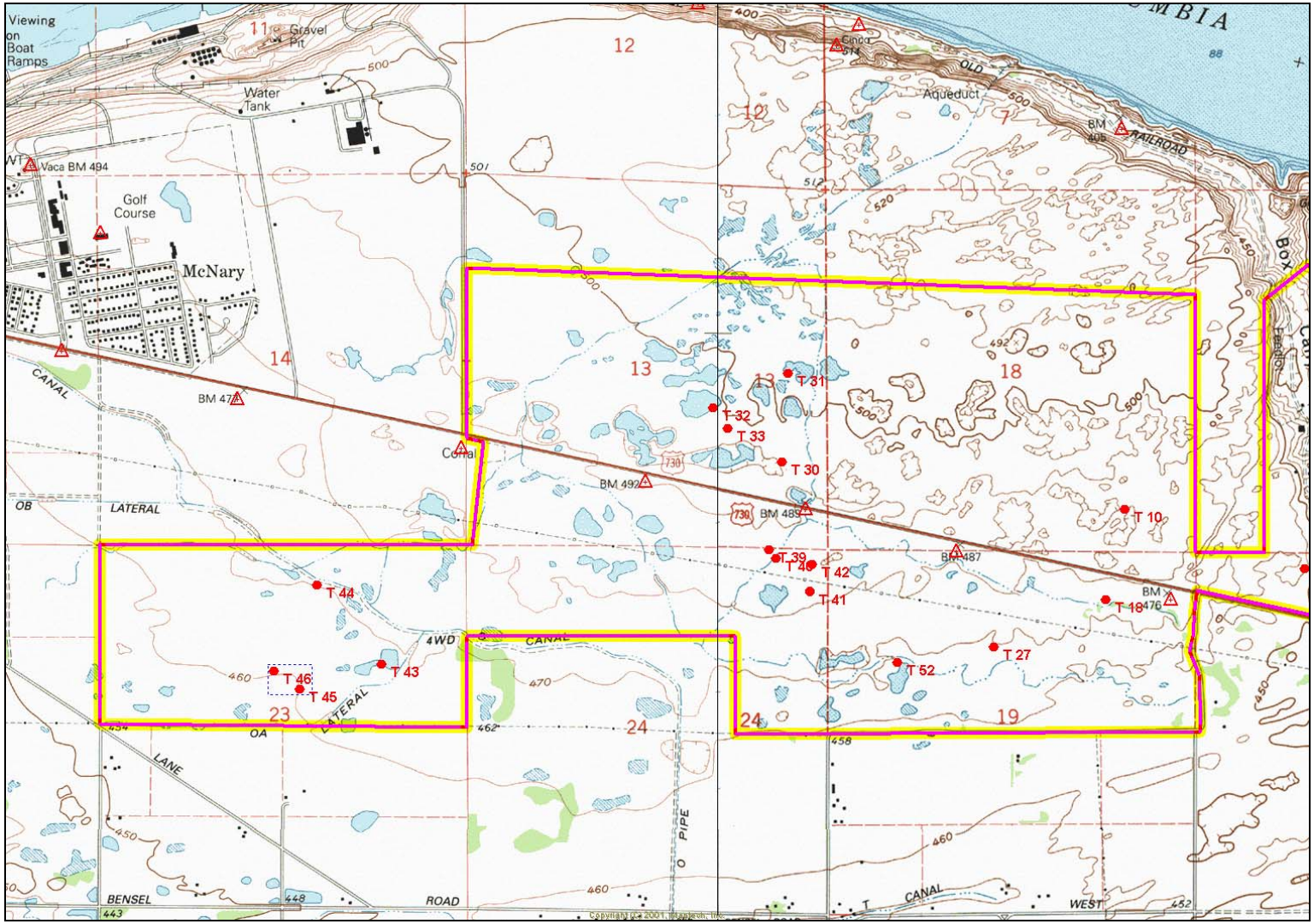

Figure 14. Transect start points on the west side of the Wanaket Wildlife Area.

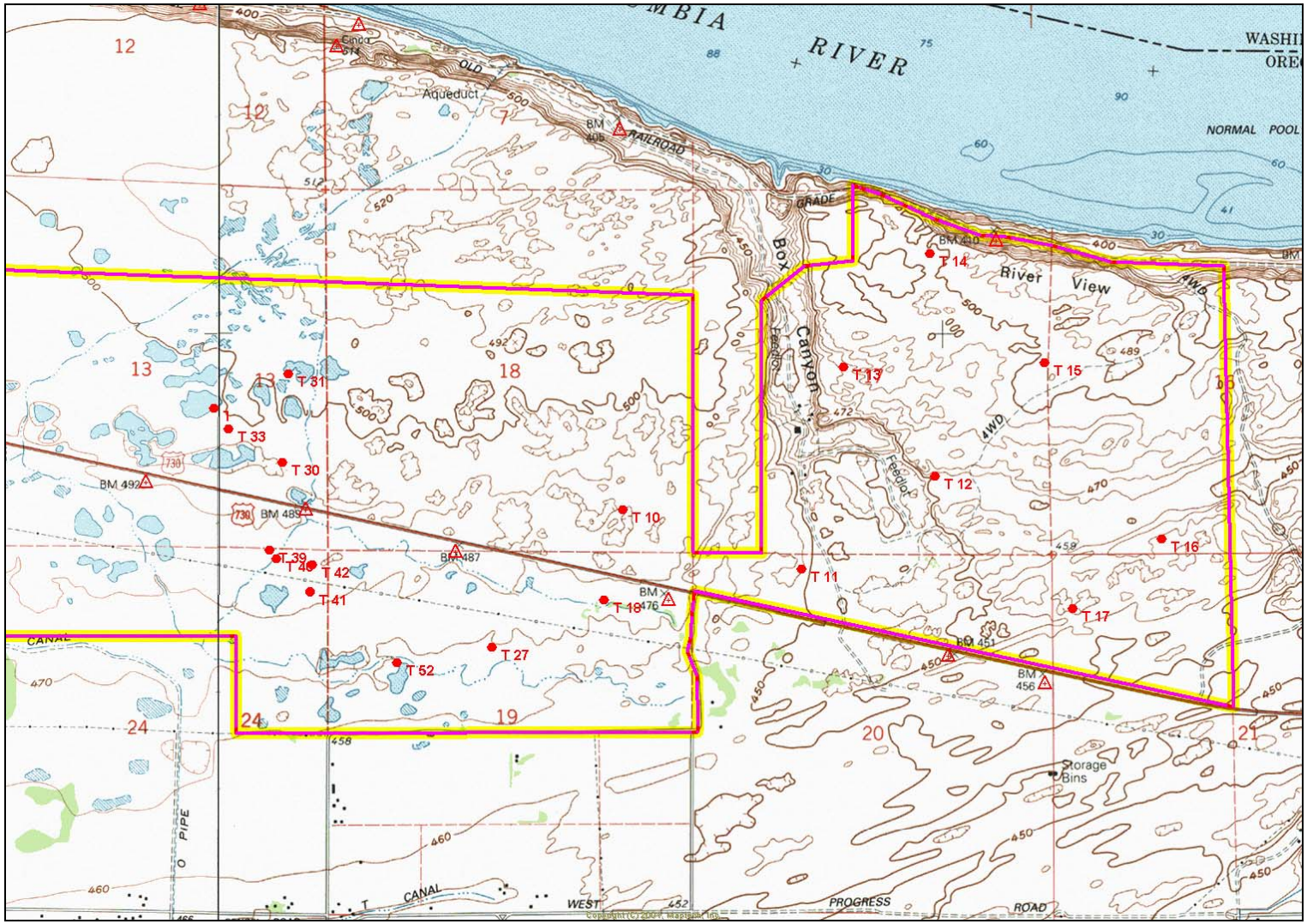

Figure 15. Transect start points on the east side of the Wanaket Wildlife Area.

Table 7. Transect UTM coordinates, magnetic azimuths, and lengths[3].

Transect #	GPS		Mag Az.	Length (ft.)	Total Length
	East	North			
3	0329198	5086801	360	300	
	0329224	5086890			300
10	0327299	5086199	165	300	
	0327288	5086102			300
11	0328086	5085909	260	300	
	0327997	5085916			300
12	0328696	5086306	79	300	
	0328789	5086292			300
13	0328298	5086808	180	300	
	0328259	5086719			300
14	0328700	5087302	190	300	
	0328663	5087216			300
16	0329697	5086000	220	300	
	0329625	5085958			300
17	0329293	5085700	19	300	
	0329355	5085776			300
18	0327199	5085798	55	300	
	0327287	5085824	100	300	
	0327358	5085770	55	300	
	0327451	5085801			900
27	0326699	5085600	48	300	
	0326779	5085651			300
30	0325796	5086456	285	1200	
	0325782	5086433			1200
31	0325824	5086483	8	180	
	0325847	5086537			180
32	0325489	5086704	230	900	
	0325312	5086727			900
33	0325550	5086609	172	100	
	0325541	5086581			100
39	0325719	5086060	210	1000	
	0325581	5086123			1000
40	0325746	5086022	188	200	
	0325722	5085972			200
41	0325891	5085869	246	1000	
	0325966	5085896			1000
42	0325905	5085989	77	200	
	0325961	5085997			200
43	0323975	5085608	270	1000	
	0323974	5085621			1000
44	0323710	5085959	214	150	
	0323691	5085923	127	150	
	0323695	5085873	214	100	

[3] The first set of coordinates are the transect start points; the last set of coordinates are transect end points; all other transect coordinates are "turn points."

Transect #	GPS		Mag Az.	Length (ft.)	Total Length
	East	North			
	0323695	5085875	127	200	
	0323729	5085825			600
45	0323619	5085499	250	300	
	0323514	5085498			300
52	0326272	5085546	213	70	N/A
Total					**10,280**

RESULTS

The Wanaket Wildlife Management Area HEP evaluation was completed by the Regional HEP Team (RHT) and CTUIR in June 2005. HEP transects established on shrubsteppe/grassland (n=12), riparian shrub (n=5), riparian herb (n=5), riparian tree (n=1), and sand/gravel/cobble/mud (n=2) cover types generated 3,084.48 habitat units for a net increase of 752.18 HUs above 1995 survey results (Table 8).

The HU to acre ratio increased from 0.84:1.0 in 1995 to 1.16:1.0 in 2005 for this project. An estimated 600 additional habitat units could have been generated if the Canada goose model was applied and if species "stacking" was identical to the McNary loss assessment. Major differences (>25%) in habitat suitability indices between the 2005 and 1995 HEP analyses are described below.

Mink, mallard, and yellow warbler habitat suitability indices differed significantly between the 2005 and 1995 HEP analyses. The 2005 mink HSI was only 0.09, but was 0.50 in 1995 within the emergent wetland cover type (These differences may be due to variations in survey techniques). The inverse was true for mink in the riparian shrub cover type where the 2005 HSI was 0.51 and only 0.10 in 1995. The positive change in HSI may be attributed to improved habitat conditions within the riparian shrub cover type.

Similar variation occurred with mallard and yellow warbler habitat suitability indices. The 2005 HSI for mallard was 0.22 while in 1995 the HSI was 0.60 (emergent wetland cover type). In contrast, the 2005 mallard HSI increased significantly over the 1995 HSI (0.89 and 0.10 respectively) within the riparian herb cover type.

Likewise, the 2005 yellow warbler HSI was 0.82, but only 0.10 in 1995 within the riparian shrub cover type. The increases in habitat suitability for yellow warbler (riparian shrub) and mallard (riparian herb) are likely due to improved habitat conditions resulting from cessation of livestock grazing.

HEP data/vegetation survey summaries and photos are included in Appendix B for all transects. Transect/data logger spreadsheets, photos, and raw data are included in the CD that accompanies this report (CD).

Table 8. Comparison of 2005 and 1995 HEP results.

Cover Type	Species	2005			1995			Difference		
		Acres	HSI	HUs	Acres	HSI	HUs	Acres	HSI	HUs
Shrubsteppe/grassland	Western meadowlark	2,477.00	0.63	1559.78	1,716.00	0.40	686.40	761.00	0.23	873.38
	California quail		0.53	1317.12		0.50	858.00		0.03	459.12
Emergent Wetland	Mink	159.00	0.09	14.42	148.50	0.50	74.25	10.50	-0.41	-59.83
	Mallard		0.22	35.30		0.60	89.10		-0.38	-53.80
Riparian Herb	California quail	35.00	0.50	17.66	35.00	0.70	24.50	0.00	-0.20	-6.84
	Mallard		0.89	31.27		0.10	3.50		0.79	27.77
	Mink		0.09	3.18		0.00	0.00		0.09	3.18
Riparian Tree	Mink	5.00	0.55	2.75	5.00	0.50	2.50	0.00	0.05	0.25
	Downy woodpecker*		0.00	0.00		0.20	1.00		-0.20	-1.00
Riparian Shrub	California quail	34.00	0.94	31.95	30.00	0.70	21.00	4.00	0.24	10.95
	Mink		0.51	17.44		0.10	3.00		0.41	14.44
	Yellow warbler		0.82	28.04		0.10	3.00		0.72	25.04
Sand/Gravel/Cobble/Mud	Mink	25.00	0.18	4.50	25.00	0.10	2.50	0.00	0.08	2.00
	Spotted Sandpiper		0.84	21.08		0.80	20.00		0.04	1.08
Developed	N/A**	30.00	0.00	0.00	30.00	0.00	0.00	0.00	0	0.00
Agriculture	California quail	0.00	0.00	0.00	776.50	0.70	543.55	-776.50	-0.70	-543.55
Totals		**2,765.00**		**3,084.48**	**2,765.00**		**2,332.30**	**0.00**		**752.18**
*Riparian Forest Cover Type did not meet minimum acreage requirements										
**HSI models not developed for this cover type										

DISCUSSION

The two largest changes in structural conditions and/or acres occurred within the shrubsteppe/grassland and agricultural cover types. Less than 1% of the shrubland plant community remains intact today (due to wildfire) when compared to the amount present in 1990.

Similarly, the agriculture lands (managed pasture) have been completely eliminated and allowed to return to a more natural state (shrubsteppe/grass community). The greatest changes in habitat units have also occurred in these two cover types as illustrated in Figure 16.

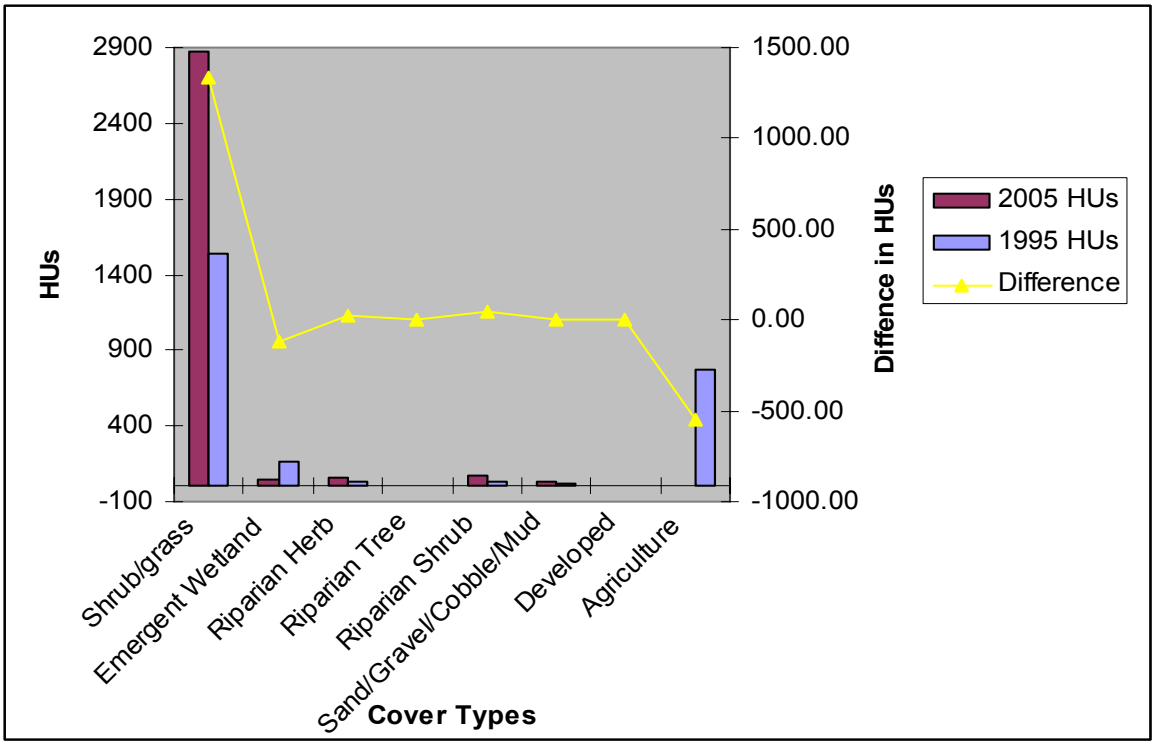

Figure 16. Comparison of 2005 and 1995 HEP results and differences between the two HEP surveys.

HEP models used during the 2005 analysis are included in Appendix A. HSI model results and comments are addressed for each cover type in the following section.

Shrubsteppe/grassland

As expected, the two factors limiting the California Quail HSI are the lack of woody shrubs and diameter of escape cover patches. Even with these limitations, the habitat suitability is still within the "fair" range (HSI = 0.53). The California quail model used to evaluate the Wanaket project was modified from an earlier model developed by the Fish and Wildlife Service (USFWS) and published within, "*Draft Terrestrial Habitat*

Evaluation Criteria Handbook for Ecoregion 2410 (1978)" (as cited in Rasmussen et al.1991).

This modified model lacks a critical habitat variable i.e. *percent shrub cover*. The only variable associated with shrubs within the modified model is shrub height, or V2. It is unclear whether or not adequate shrub cover was assumed to be present when this modification was made (this issue is problematic for all project managers that use this California quail model to credit HUs to the lower four Columbia River Dams).

In contrast, the California quail model used for Lower Snake River mitigation projects is a landscape model with variables that better address the shrub component. It is highly probable that California quail HSI/HUs would be lower for the Wanaket project if the Lower Snake California quail model was used, or if model modifications included a *percent shrub* variable.

The HSI for western meadowlark is 0.63, or within the "good" habitat range for the shrubsteppe/grassland cover type. Herbaceous height is the most limiting habitat variable for this model. This is a result of the predominance of cheatgrass and Sandberg bluegrass within the herbaceous cover layer. The western meadowlark model used in this HEP analysis and throughout the Columbia Basin Region was modified from the *Eastern Meadowlark Model* developed by Schroeder and Sousa (1982).

Emergent Wetland

Habitat conditions for the mink are "poor" (HSI = 0.09) within this cover type based on the HSI mink model developed by Allen (1986). Individual habitat variable suitability indices (SI) did not exceed "marginal" and ranged from 0.22 to 0.36. The lack of shrubs and trees within 100 meters of the wetlands accounted for the lowest SI while the "percent of year with surface water available" variable provided the highest SI (still marginal at 0.36). The median suitability index (0.26) is due to the general lack of "persistent emergent vegetation" including cattails and bulrushes *(Scirpus spp.)*.

Similar to the mink model, the lack of emergent cover for brood habitat results in the mallard model HSI rating of "marginal" (HSI = 0.22) within this cover type. This model is a compilation of habitat variables from several mallard models developed by the USFWS during the mid 1980s and input from local state, federal, and tribal wildlife biologists (Rasmussen et al.1991).

Riparian Herb

Mink habitat in the riparian herb cover type is rated "poor" with an HSI of 0.09. As in the emergent wetland cover type, the lack of shrubs and trees within 100 meters of the wetlands accounts for the lowest SI while the "percent of year with surface water available" variable provided the highest SI (0.36). Persistent vegetation is also absent.

Mallard nesting habitat is rated "good" with and HSI of 0.89. Height of herbaceous vegetation is the only model variable that is less than optimum (SI = 0.68).

Similarly, California quail habitat is rated "fair" (HSI = 0.50). The lack of shrubs (which would be expected in this cover type) and the "average diameter of escape cover patches" (V 4) drives the overall HSI score down. This modified model, as constructed, is not well suited for use in the riparian herb cover type.

Riparian Tree

The downy woodpecker (Schroeder 1983) habitat suitability index is 0.00 for this cover type because patch size is less than the minimum threshold required for this species and the cover type lacks snags. In addition, basal area (V1) measurements are low i.e., SI = 0.18 (it is unclear how a HSI and associated HUs were determined in the 1995 HEP analysis as acreage figures for this cover type have not changed).

The mink HSI, on the other hand, is rated "fair" with a HSI of 0.55. The limiting variable (V4), the absence of trees and shrubs within 100 meters of this cover type, is problematic for all project cover types suitable for mink.

Riparian Shrub

California quail habitat is within the "optimum" range (HSI = 0.94) in this cover type. The lowest rated model variable is V4, "average diameter of escape cover patches," with a SI of 0.70 or "good." This is the highest HSI rating (0.94) given to any species in this analysis.

As in other cover types, the mink habitat suitability index is 0.51 and considered "fair." Again, the limiting factor is the absence of trees and shrubs within 100 meters of this cover type (V4).

Yellow warbler habitat is rated "good" with a HSI of 0.82. The variable keeping this cover type from reaching optimum conditions is "percent deciduous shrub cover," or V1. This habitat variable will likely reach full potential in the near future with just passive management.

Sand/Gravel/Cobble/Mud

Two transects were conducted on this cover type. The spotted sandpiper and mink models were used to evaluate habitat conditions. Spotted sandpiper habitat is rated "good" (HSI = 0.84) while mink habitat is rated "poor" (HSI = 0.18).

The weakest spotted sandpiper habitat variable is V1 (percent herbaceous cover-for nesting). Optimum distance for nesting habitat is within 75 feet of water. Nesting does not appear to occur beyond 300 feet of water (Dorsey, as cited in Rasmussen et al.1991). Extant edaphic features, primarily rocky shallow soils, adjacent to this cover type will

likely continue to limit spotted sandpiper nesting opportunities within this relatively narrow 300 foot band.

Surface water is present adjacent to this cover type throughout the year, which is considered optimum conditions for mink. Mink habitat suitability is limited, however, by the lack of persistent vegetation (cattails and bulrushes) and shrub/tree cover within 100 meters of the cover type.

Developed

This cover type has little wildlife value and was not surveyed during this analysis. In addition, HEP models have not been developed for this cover type.

ACKNOWLEDGEMENTS

I gratefully acknowledge the support of Jenny Barnett (CTUIR) and the Confederated Tribes of the Umatilla Indian Reservation Wildlife Program staff for assistance with this analysis. The support and efforts of Regional HEP Team members including Sara Wagoner, Brandy Ellis, and Mike Wilkinson are also recognized and appreciated.

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APPENDIX A

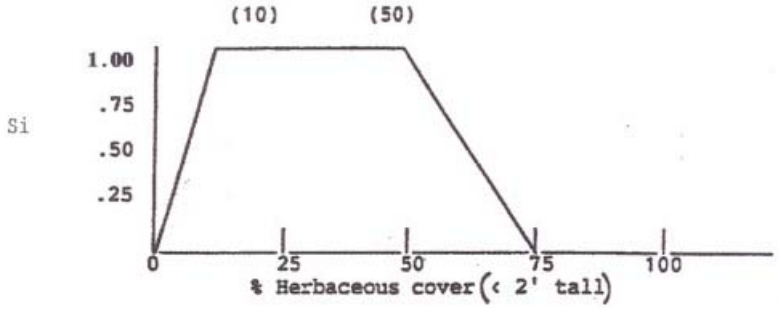
SPOTTED SANDPIPER SUITABILITY INDEX

Nesting Cover (V1)

A mosaic of herbaceous ground cover with an overall density of less than 50% and less than 2' high (an overstory of deciduous trees can be present if the ground cover requirements are met).

Flooding probably not a significant problem as the sandpiper is quite capable of renesting if necessary.

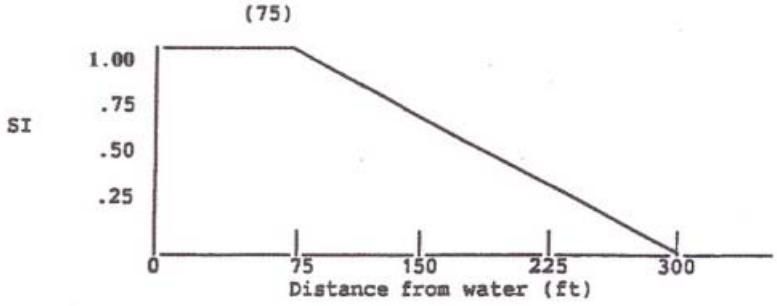
[150 ft. transect, 25 ft. intervals. Begin transect where V3 crosses daily high water mark and continue inland 150 ft.]



Nesting distance from water (V2)

Optimum Nesting habitat is within 75 ft. of water.

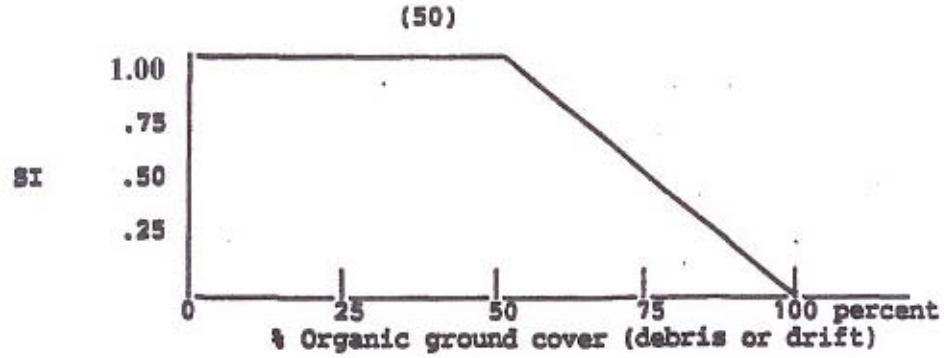
[measure minimum distance between nesting habitat and water]



Foraging habitat (V3) -

Open or sparsely vegetated **shorelines** (gravel, **riprap,** or sandy substrates) **within** 150 **feet (45 m) of water** (normal pool) which may contain some **organi debris or drift.**

[Begin transect at EOW and go inland 150 ft. with measurements **every** 25 ft.



Modal Equation

$$HSI = \frac{V1 + v2 + V3}{3}$$

Yellow Warbler HSI Model

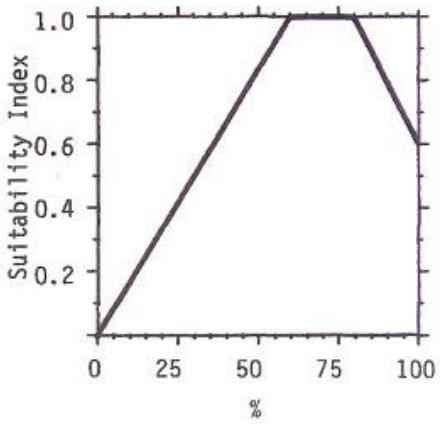
It is assumed that optimal habitats contain 100% hydrophytic deciduous shrubs and that habitats with no hydrophytic shrubs will provide marginal suitability. Shrub densities between 60 and 80% crown cover are assumed to be optimal. As shrub densities approach zero cover, suitability also approaches zero. Totally closed shrub canopies are assumed to be of only moderate suitability, due to the probable restrictions on movement of the warblers in those conditions. Shrub heights of 2 m (6.6 ft) or greater are assumed to be optimal, and suitability will decrease as heights decrease to zero.

Each of these habitat variables exert a major influence in determining overall habitat quality for the yellow warbler. A habitat must contain optimal levels of all variables to have maximum suitability. Low values of any one variable may be partially offset by higher values of the remaining variables. Habitats with low values for two or more variables will provide low overall suitability levels.

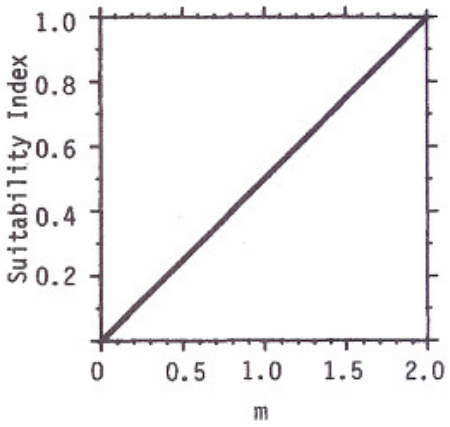
Model Relationships

Suitability Index (SI) graphs for habitat variables. This section contains suitability index graphs that illustrate the habitat relationships described in the previous section.

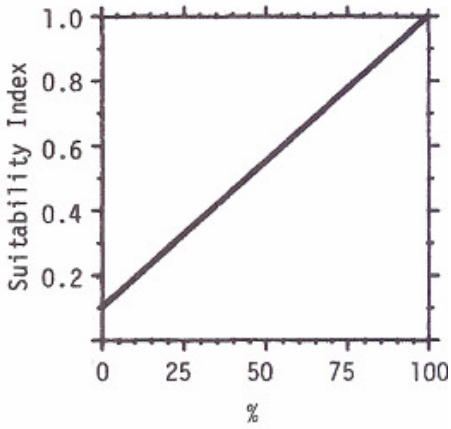
Cover type	Variable	
DS,DSW	V_1	Percent deciduous shrub crown cover.



DS,DSW	V_2	Average height of deciduous shrub canopy.



DS,DSW	V_3	Percent of deciduous shrub canopy comprised of hydrophytic shrubs.



Equations. In order to obtain life requisite values for the yellow warbler, the SI values for appropriate variables must be combined with the use of equations. A discussion and explanation of the assumed relationship between variables was included under Model Description, and the specific equation in this model was chosen to mimic these perceived biological relationships as closely as possible. The suggested equation for obtaining a reproduction value is presented below.

Life requisite	Cover type	Equation
Reproduction	DS,DSW	$(V_1 \times V_2 \times V_3)^{1/2}$

HSI determination. The HSI value for the yellow warbler is equal to the reproduction value.

Application of the Model

Definitions of variables and suggested field measurement techniques (Hays et al. 1981) are provided in Figure 2.

Variable (definition)		Cover types	Suggested technique
V_1	Percent deciduous shrub crown cover (the percent of the ground that is shaded by a vertical projection of the canopies of woody deciduous vegetation which are less than 5 m (16.5 ft) in height).	DS,DSW	Line intercept
V_2	Average height of deciduous shrub canopy (the average height from the ground surface to the top of those shrubs which comprise the uppermost shrub canopy).	DW,DSW	Graduated rod
V_3	Percent of deciduous shrub canopy comprised of hydrophytic shrubs (the relative percent of the amount of hydrophytic shrubs compared to all shrubs, based on canopy cover).	DS,DSW	Line intercept

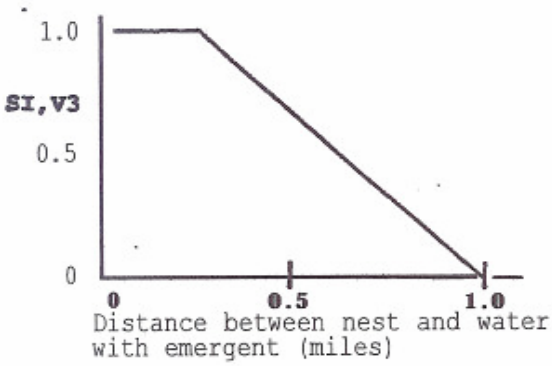
Figure 2. Definitions of variables and suggested measurement techniques.

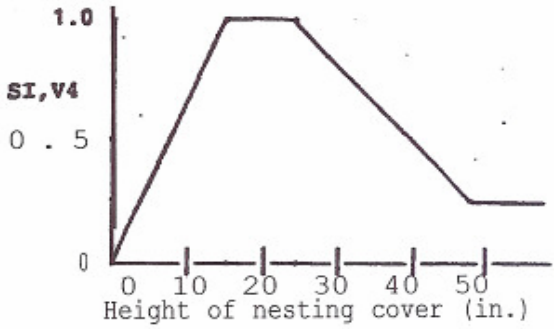
Appendix A continued

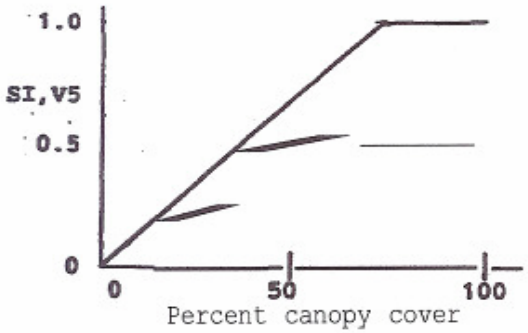
MALLARD HABITAT SUITABILITY INDEX

NESTING

Cover Types: **Riparian** Herb and **Shrub/Steppe/Grassland**







V6, Disturbance by people and dogs

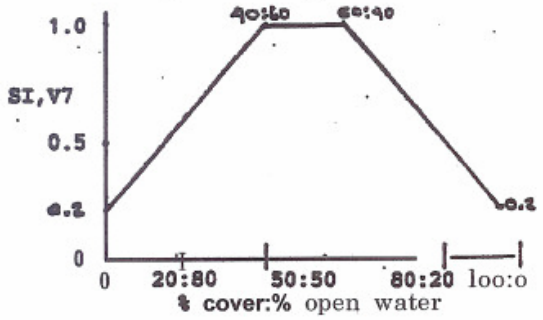
	S.I.
Low	0.8-1.0
Medium	**0.4-0.7**
High	**0.0-0.3** .

Model Equation

$$\mathbf{HSI} = \frac{v3 + v4 + v5}{3} \quad \mathbf{XV6}$$

Appendix A continued

Cover Type : Emergent wetland



Model **equation**

ESI = v7

WINTERING

Cover Type: **Open** Water

V-l, Velocity **of open** water

Preproject
main river **SI** = 0.5
backwater SI = 0.8

Postproject
main **river** **SI** = 0.7
backwater **SI** = 0.9
barge **channel** SI = 0.4

Cover Type: Agricultural **(food crop)**

V-2, crop management

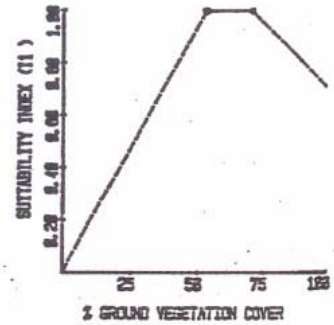
For the mid-Columbia **Basin** projects **the HEP** study team **assumed** that both **pre-** and post-project **crop** management **provided** an adequate mallard **food supply.** Food supply is **not** a limiting **factor.**

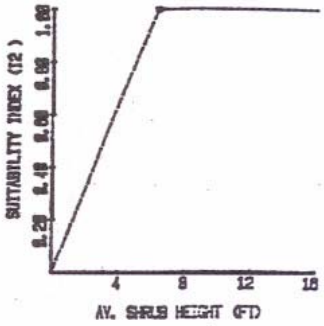
Model equation for wintering mallard: HSI = V-l

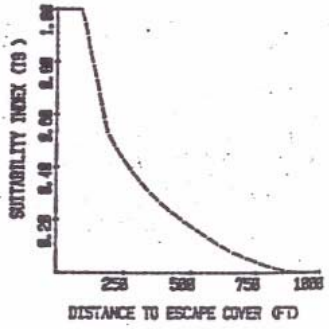
JUNE 1978

CALIFORNIA QUAIL

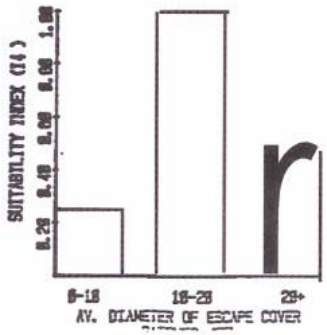
GRASSLAND/AGRICULTURAL

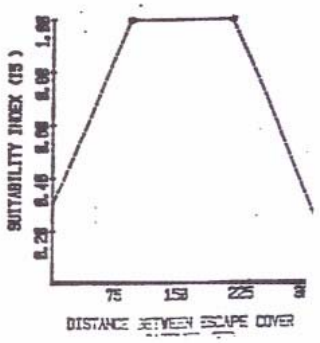






ESCAPE COVER-DENSE GROWTH OF SHRUBS, VINE TANGLES, OR DENSE TALL GRASSES OR FORBS GREATER THAN 9 INCHES TALL





Appendix A continued.

June 1978

HASITAT SUITABILITY INDEX

Cal ffornia Quail in Grassland/Agricultural Type

Ecoregfon 2410

$$\text{Cover Value } (X,) = \frac{I_1 + I_2 + (\text{'3} \times \text{I4} \times I_5)^{1/3}}{3}$$

Where: I_1 = Suitability Index (SI) of percent ground vegetation cover.

I_2 = SI of average shrub height.

I_3 = SI of distance to escape cover.

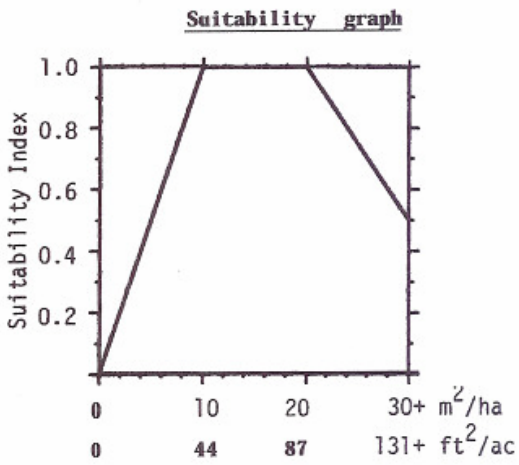
I_4 = SI of average diameter of escape cover patches.

I_5 = SI of distance between escape cover patches.

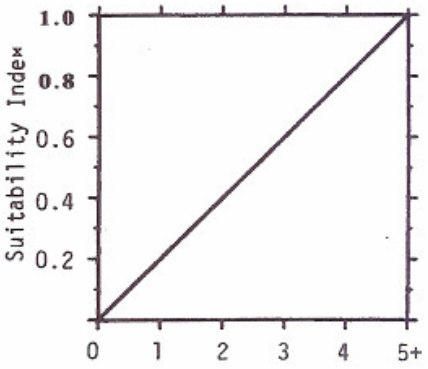
The Habitat Suitability Index is XI.

Downy Woodpecker HSI Model

Cover type	Variable	
EF,DF, EFW,DFW	V_1	Basal area.



EF,DF, EFW,DFW	V_2	Number of snags > 15 cm dbh/0.4 ha (> 6 inches dbh/ 1.0 acre).



Life requisite values. The life requisite values for the downy woodpecker are presented below.

Life requisite	Cover type	Life requisite value
Food	EF,DF,EFW,DFW	V_1
Reproduction	EF,DF,EFW,DFW	V_2

HSI determination. The HSI for the downy woodpecker is equal to t lowest life requisite value.

Application of the Model

Definitions of variables and suggested field measurement techniques (Ha et al. 1981) are provided in Figure 2.

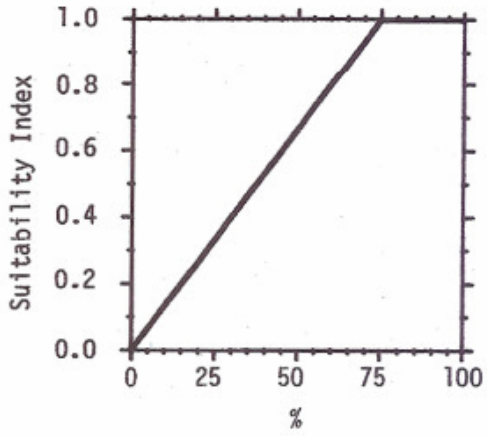
Variable (definition)		Cover types	Suggested techniqu
V_1	Basal area [the area of exposed stems of woody vegetation if cut horizontally at 1.4 m (4.5 ft) height, in m^2/ha (ft^2/acre)].	EF,DF,EFW,DFW	Bitterlich method
V_2	Number of snags > 15 cm (6 inches) dbh/0.4 ha (1.0 acre) [the number of standing dead trees or partly dead trees, greater than 15 cm (6 inches) diameter at breast height (1.4 m/4.5 ft), that are at least 1.8 m (6 ft) tall. Trees in which at least 50% of the branches have fallen, or are present but no longer bear foliage, are to be considered snags].	EF,DF,EFW,DFW	Quadrat

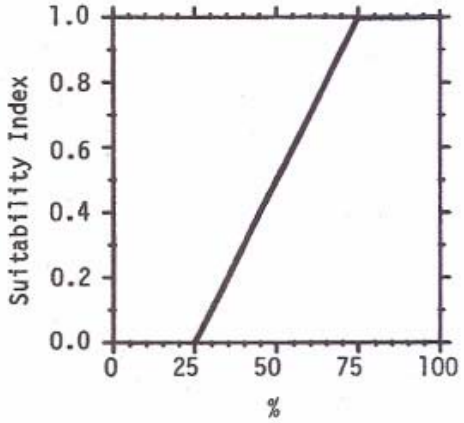
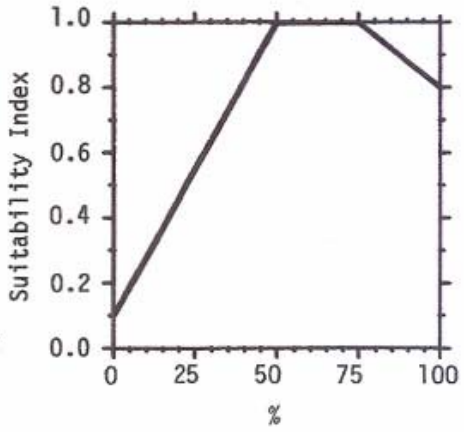
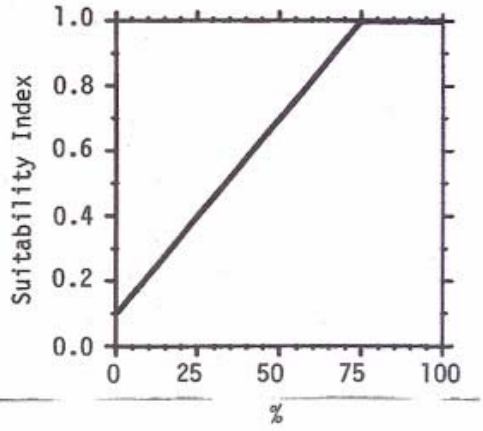
Figure 2. Definitions of variables and suggested measurement tecnniques.

Mink HSI Model

Suitability Index (SI) graphs for habitat variables. The relationships between various conditions of habitat variables and habitat suitability for the mink are graphically represented in this section.

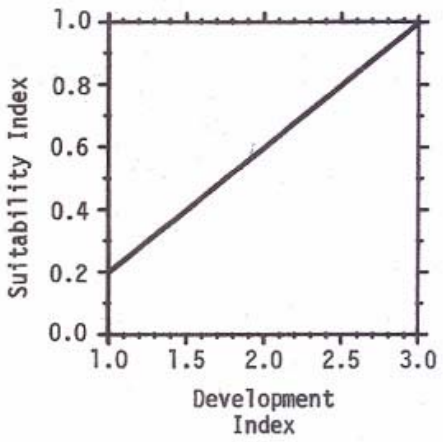
Cover type	Variable	
EFW,DFW, ESW,DSW	V_1	Percent tree, shrub, and/or persistent emergent herbaceous vegetation canopy closure.



EFW,DFW, ESW,DSW, HW,R,L	V_2	Percent of year with surface water present.	
HW	V_3	Percent of wetland basin dominated by persistent emergent herbaceous vegetation.	
EFW,DFW, DSW,ESW, HW,R,L	V_4	Percent tree and/or shrub canopy closure within 100 m (328 ft) of water's or wetland's edge.	

12

L	V_5	Shoreline development factor.



Equations. In order to obtain life requisite values for the mink, the SI values for appropriate variables must be combined through the use of equations. A discussion and explanation of the assumed relationships between variables was included under Model Description, and the specific equations in this model were chosen to mimic these perceived biological relationships as closely as possible. The suggested equations for obtaining a food/cover value are presented by cover type in Figure 2.

Life requisite	Cover type	Equations
Food/cover	EFW,DFW,ESW,DSW [< 405 ha (1,000 acres) in size]	$V_2 \frac{V_1 + V_4}{2}$
Food/cover	EFW,DFW,ESW,DSW [≥ 405 ha (1,000 acres) in size]	$(V_1 \times V_2)^{1/2}$
Food/cover	HW	$V_2 \frac{4V_3 + V_4}{5}$
Food/cover	L	$(V_4 \times V_5)^{1/2}$
Food/cover	R	$(V_2^2 \times V_4)^{1/3}$

Figure 2. Equations for determining life requisite values by cover type for the mink.

13

HSI determination. Because food/cover was the only life requisite considered in this model, the HSI equals the food/cover value determined for a specific cover type.

Application of the Model

Potential mink habitat must contain a relatively permanent source of surface water. Because of the mink's use of upland habitats for denning and foraging, optimum mink habitat must also contain suitable cover adjacent to the water body or wetland. Therefore, the application of this model and the determination of habitat units is based on an evaluation of the quality of the wetland, lacustrine, or riverine cover type and a 100 m (328 ft) band of habitat surrounding the aquatic portion of the habitat. Figure 3 illustrates the relationship of cover types to the suggested evaluation area.

Cover type	Area for evaluation
Lacustrine HSI determined only for area contained within 100 m (328 ft) band around lake.	
Riverine HSI determined for area within 100 m band on both sides of river plus area of river.	
Palustrine (herbaceous wetlands, forested wetlands, or shrub wetlands). Less than 405 ha (1,000 acres) in size. HSI determined for area contained within cover type plus area within 100 m band around wetland cover type.	
Palustrine (forested wetlands or shrub wetlands) 405 ha (1,000 acres) or larger in size HSI determined for area contained only within cover type.	

Figure 3. Guidelines for determining the area to be evaluated for mink habitat suitability under various cover type conditions.

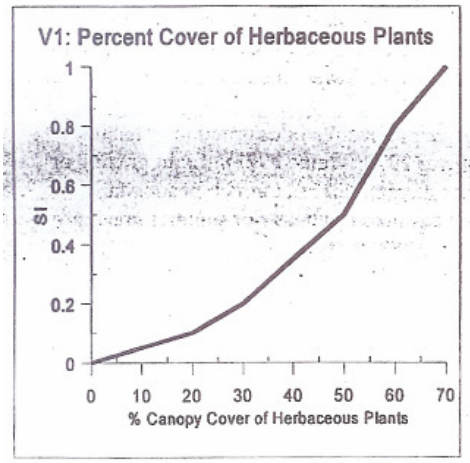
14

WESTERN MEADOWLARK

Modified from Schroeder and Sousa, 1982.

Cover Types: Grassland, Shrubgrass, Shrubland, Pasture, Shrub-steppe

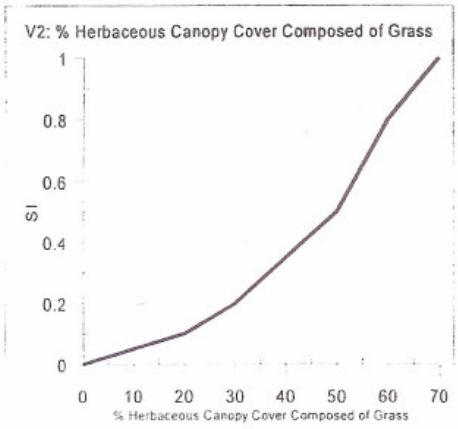
V1: Percent canopy cover of herbaceous plants



Cover Requirements

Western meadowlarks are adapted to short grass and mixed grass prairies, preferring large fields with short vegetation and good drainage. Western meadowlarks exhibit tolerance for a wide variety of plant associations and are widely distributed in Washington-commonly occurring in meadows, orchards, thickets, and cultivated areas. Conversion of woodlands to agricultural fields has favored western meadowlark populations in Washington.

V2: Percent of herbaceous canopy cover composed of grass



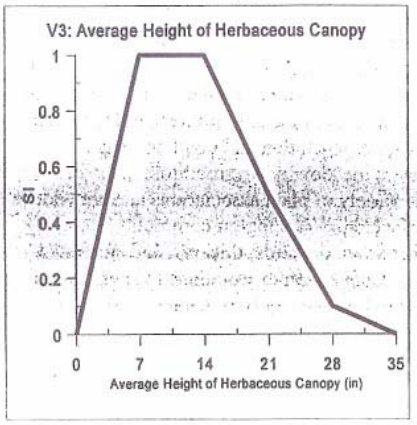
Food Requirements

Bryant (1914), Weins (1973) et.al. suggest that animal material, primarily insects, comprise approximately 63% of the meadowlark's diet while 37% is made up of vegetative matter. Vegetable matter consisted of one-third grain and two-thirds weed seeds. Spring and summer diet was primarily insects with a shift to seeds in fall and winter. Hubbard and Hubbard (1969) reported meadowlarks eating carrion including their own species. It is doubtful that food supply is ever a limiting factor for this species (Lanyon, 1956).

Water Requirements

WESTERN MEADOWLARK (cont.)

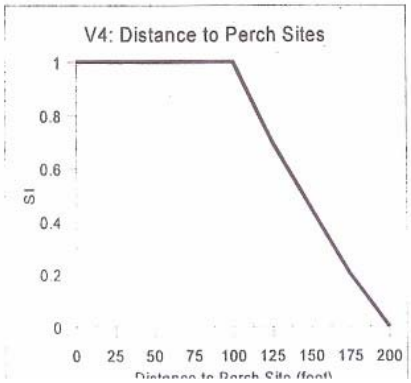
V3: Average height of herbaceous canopy (inches)



Because of its habitat preferences, western meadowlarks are affected by agricultural activities. Increased clearing and cultivation results in an increase of habitat for this species (Bryant 1914; Jewett et.al. 1953).

Overgrazing results in destruction of habitat (Rohwer 1972; Weins 1973). Light grazing or winter grazing does not affect meadowlark habitat as much as heavy or summer grazing (Weins 1973).

V4: Distance to Perch Sites (feet)

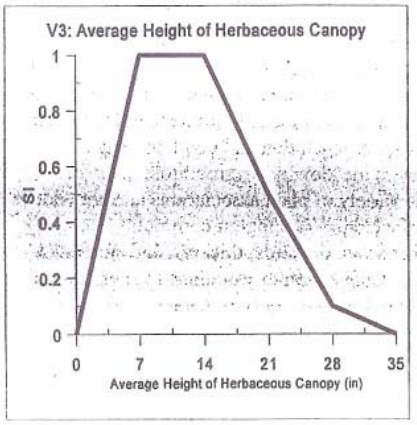


Reproductive Requirements

Males require elevated perches, such as shrubs, fence posts, or telephone poles as singing sites. Nests are located on the ground, often in depressions or under shrub cover or tussocks of grass (Bent 1958).

WESTERN MEADOWLARK (cont.)

V3: Average height of herbaceous canopy (inches)



Because of its habitat preferences, western meadowlarks are affected by agricultural activities. Increased clearing and cultivation results in an increase of habitat for this species (Bryant 1914; Jewett et.al. 1953).

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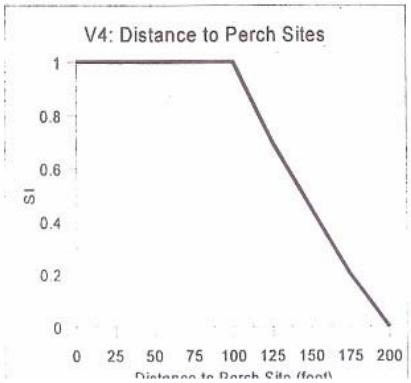
V4: Distance to Perch Sites (feet)

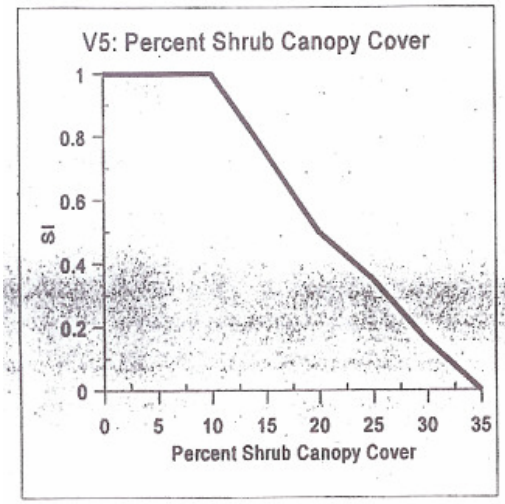


Reproductive Requirements

Males require elevated perches, such as shrubs, fence posts, or telephone poles as singing sites. Nests are located on the ground, often in depressions or under shrub cover or tussocks of grass (Bent 1958).

WESTERN MEADOWLARK (cont.)

V5: Percent Shrub Canopy Cover



Model Equation:

HSI = (V1 x V2 x V3 x V4)¼ x V5

APPENDIX B

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 3

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 3
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	329198	5086801	360	300
Turning Point				
Turning Point				
Turning Point				
End	329224	5086890	Total Length	300

Microplot Data: 12 PLOTS NEEDED — 12 PLOTS ENTERED — 0 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 4.8 0.10 ft
% CC TOTAL 63.8%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	78.6%			
%CC	dist to perch	22.5%			
%CC	dist to escape	21.3%			
%CC	------				
		TOTAL %cc Grass	0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 10

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 10
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	327299	5086199	165	300
Turning Point				
Turning Point				
Turning Point				
End	327288	5086102	Total Length	300

Microplot Data: 12 PLOTS NEEDED 12 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: .10 m sq. **Mean Veg height** 4.1 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 64.7%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	82.8%			
%CC	dist to perch	27.9%			
%CC	dist to escape	25.8%			
%CC	------				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 11

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 1
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	328086	5085909	260	300
Turning Point				
Turning Point				
Turning Point				
End	327997	5085916	Total Length	300

Microplot Data: 12 PLOTS NEEDED 12 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 4.7 0.10 ft
% CC TOTAL 81.7%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	75.3%			
%CC	dist to perch	48.8%			
%CC	dist to escape	22.3%			
%CC	- - - - - -				
		TOTAL %cc Grass	0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 12

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 12
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	328696	5086306	79	300
Turning Point				
Turning Point				
Turning Point				
End	328789	5086292	Total Length	300

Microplot Data: 12 PLOTS NEEDED 12 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: .10 m sq. **Mean Veg height** 3.8 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 72.5%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	77.0%			
%CC	dist to perch	64.2%			
%CC	dist to escape	31.3%			
%CC	------				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 13

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 13
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	328298	5086808	180	300
Turning Point				
Turning Point				
Turning Point				
End	328259	5086719	Total Length	300

Microplot Data: 12 **PLOTS NEEDED** 12 **PLOTS ENTERED** 0 **PLOTS BARE**
Microplot frame size: 0.10 m sq. **Mean Veg height** 3.1 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 74.9%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	86.2%			
%CC	dist to perch	52.1%			
%CC	dist to escape	41.3%			
%CC	- - - - - -				
			TOTAL %cc Grass 0.0%	**TOTAL %cc Forbs** 0.0%	**TOTAL %cc Exotic** 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 14

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 14
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	328700	5087302	190	300
Turning Point				
Turning Point				
Turning Point				
End	328663	5087216	Total Length	300

Microplot Data: 12 **PLOTS NEEDED** 12 **PLOTS ENTERED** 0 **PLOTS BARE**
Microplot frame size: 0.10 m sq. **Mean Veg height** 5.0 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 76.3%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	84.8%			
%CC	dist to perch	50.8%			
%CC	dist to escape	17.7%			
%CC	- - - - - -				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 16

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 16
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	329697	5086000	220	300
Turning Point				
Turning Point				
Turning Point				
End	329625	5085958	Total Length	300

Microplot Data: 12 PLOTS NEEDED 12 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 3.9 0.10 ft
% CC TOTAL 66.1%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	79.4%			
%CC	dist to perch	63.8%			
%CC	dist to escape	65.0%			
%CC	------				
		TOTAL %cc Grass	0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 17

Photo:

*photo displays TR 0, it should display TR 17, was a mistake in field communication

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/20/05
Transect Number: 17
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	329293	5085700	19	300
Turning Point				
Turning Point				
Turning Point				
End	329355	5085776	Total Length	300

Microplot Data: 12 PLOTS NEEDED 12 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: 0.10 m sq. **Mean Veg height** 4.0 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 68.3%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	81.2%			
%CC	dist to perch	40.8%			
%CC	dist to escape	34.2%			
%CC	- - - - - -				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 18

Photo:

Field data:

SHRUB TRANSECT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 18
Investigators: Ashley, Wagoner, Wilkinson

Covertype: Shrub-steppe
Transect Type point intercept
Unit of measure: ft
Interval: 2 ft
Sample unit size: 100 ft
Height unit of measure: 0.10 ft

	GPS COORDINATES		Mag AZ	Length
Start	327199	5085798	55	300
Turning Pt.	327287	5085824	100	300
Turning Pt.	327358	5085770	55	300
Turning Pt.				
End	327451	5085801	Total Length	900

Shrub Intercept Data: **450** POINTS NEEDED **450** POINTS ENTERED **372** POINTS are BARE

Species	N	% CC	Mean height	s	%cc s	y	%cc y	m	%cc m	d	%cc d	vd	%cc vd	dd	%cc dd
big sage	71	15.8%	37.5	0	0.0%	0	0.0%	18	25.4%	42	59.2%	1	1.4%	10	14.1%
green rabbitbrush	4	0.9%	16.0	0	0.0%	0	0.0%	0	0.0%	1	25.0%	2	50.0%	1	25.0%
russian olive	3	0.7%	70.0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	100.0%	0	0.0%

AGE DISTRIBUTION	N	%
Seedling	0	0.00%
Young	0	0.00%
Mature	18	23.08%
Decadent	43	55.13%
Very Decadent	6	7.69%
Dead	11	14.10%

Overall Height	
MEAN	37.7
MODE	52.0
MAX	70.0
MIN	6.0
ST.DEV	16.4
TOTAL CC	17.3%

AGE KEY

Symbol	Meaning
s	seedling
y	young
m	mature
d	decadent
vd	very decadent
dd	dead

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 18
Investigators: Ashley, Wagoner

Covertype: Shrub-steppe
Transect Type point-intercept
Unit of measure: feet
Interval: Ind.
Number of plots 36

	GPS COORDINATES		Mag AZ	Length
Start	327199	5085798	55	300
Turning Point	327287	5085824	100	300
Turning Point	327358	5085770	55	300
Turning Point				
End	327451	5085801	Total Length	900

Microplot Data: **36** PLOTS NEEDED **36** PLOTS ENTERED **0** PLOTS BARE

Microplot frame size: 0.10 m sq.
Plot interval: 25 ft

Mean Veg height 2.2 0.10 ft
% CC TOTAL 40.1%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	89.8%			
%CC	dist to perch	4.7%			
%CC	dist to escape	7.0%			
%CC	- - - - - -				

Habitats & Wildlife

TOTAL %cc Grass 0.0% **TOTAL %cc Forbs** 0.0% **TOTAL %cc Exotic** 0.0%

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 27

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 27
Investigators: Ashley, Wagon

Covertype: Steppe
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: 12 PLOTS NEEDED 12 PLOTS ENTERED 2 PLOTS BARE
Microplot frame size: 0.10 m sq. **Mean Veg height** 2.8 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 36.7%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	70.4%			
%CC	dist to perch	43.8%			
%CC	dist to escape	54.2%			
%CC	dist to roost	83.8%			
		TOTAL %cc Grass	0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 30

Photo:

Field data:

Baseline

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 30
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 48

	GPS COORDINATES		Mag AZ	Length
Start	325796	5086456		1200
Turning Point				
Turning Point				
Turning Point				
End	325782	5086433	Total Length	1200

Microplot Data: 48 PLOTS NEEDED 48 PLOTS ENTERED 3 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 12.5 0.10 ft
% CC TOTAL 70.7%

		GRASS % CC	FORB % CC	EXOTIC % CC
%CC dist to escape	150.0%			
%CC diameter of escape	28.0%			
%CC dist between escap	150.0%			
%CC dist to roost	0.0%			
		TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

COMPLEX RIPARIAN HABITAT TRANSECT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 30baseline
Investigators: Ashley, Ellis, Wilkinson
Number of points: 240
Height unit of measure: 0.10 ft

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Pt.				
Turning Pt.				
Turning Pt.				
End			Total Length	0

240 POINTS NEEDED **240** POINTS ENTERED

Species	N	% CC	Mean layer species height Layer 1	Layer 2	Layer 3	Layer 4		
russian olive	83	34.6%	167.78	90.00	0.00	0.00	0.10 ft	
persistant veg.	66	27.5%	54.68	62.00	0.00	0.00	0.10 ft	
bebbs willow	15	6.3%	74.58	108.33	0.00	0.00	0.10 ft	
eastern cottonwood	9	3.8%	158.83	70.33	0.00	0.00	0.10 ft	
Transect Layer Mean Height			113.97	82.67	0.00	0.00	0.10 ft	

72.1%	COMBINED Canopy Cover
31.67%	BARE POINTS
68.33%	POINTS have 1 species
3.75%	POINTS have 2 species
NO	POINTS have 3 species
NO	POINTS have 4 species

Habitats & Wildlife

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 30
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 44

	GPS COORDINATES		Mag AZ	Length
Start	325796	5086456		1200
Turning Point				
Turning Point				
Turning Point				
End	325782	5086433	Total Length	1200

Microplot Data: 44 PLOTS NEEDED 44 PLOTS ENTERED 2 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 5.8 0.10 ft
% CC TOTAL 66.8%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	% comp grass	71.2%			
%CC	dist to perch	10.9%			
%CC	------				
%CC	------				
		TOTAL %cc Grass	0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

For lateral shrub data refer to individual lateral shrub data on data CD - must average the means for each lateral.

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 31

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 31
Investigators: Ashley, Wagon

Covertype: Riparian herb
Transect Type line intercept
Unit of measure: feet
Interval: Ind.
Number of plots 7

	GPS COORDINATES		Mag AZ	Length
Start	325824	5086483	8	180
Turning Point				
Turning Point				
Turning Point				
End	325847	5086537	Total Length	180

Microplot Data: 7 PLOTS NEEDED 7 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size:).10 m sq.
Plot interval: 25 ft
Mean Veg height 23.0 0.10 ft
% CC TOTAL 90.0%

		GRASS % CC	FORB % CC	EXOTIC % CC
%CC	------			
%CC	diameter of escape 0.5%			
%CC	dist to escape 1.0%			
%CC	------			
		TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 32

Photo:

Field data:
Baseline data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 32
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 40

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: 40 PLOTS NEEDED 40 PLOTS ENTERED 1 PLOTS BARE
Microplot frame size: 0.10 m sq. **Mean Veg height** 10.3 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 51.1%

		GRASS % CC	FORB % CC	EXOTIC % CC
%CC dist to escape	150.0%			
%CC diameter of escape	28.0%			
%CC list between escap	150.0%			
%CC dist to roost	0.0%			
		TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

COMPLEX RIPARIAN HABITAT TRANSECT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 32baseline
Investigators: Ashley, Ellis, Wilkinson
Number of points: 200
Height unit of measure: 0.10 ft

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Pt.				
Turning Pt.				
Turning Pt.				
End			Total Length	0

200 POINTS NEEDED **200** POINTS ENTERED

Species	N	% CC	Mean layer species height Layer 1	Layer 2	Layer 3	Layer 4		
russian olive	91	45.5%	183.41	121.67	0.00	0.00	0.10 ft	100.5% COMBINED Canopy Cover
persistant veg.	110	55.0%	63.03	0.00	0.00	0.00	0.10 ft	2.50% BARE POINTS
								97.50% POINTS have 1 species
								3.00% POINTS have 2 species
								NO POINTS have 3 species
								NO POINTS have 4 species
Transect Layer Mean Height			123.22	121.67	0.00	0.00	0.10 ft	

Habitats & Wildlife

Lateral Data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 32 LATS
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 48

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: 48 PLOTS NEEDED 48 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: .10 m sq.
Plot interval: 25 ft
Mean Veg height 3.2 0.10 ft
% CC TOTAL 57.5%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	% comp grass	87.3%			
%CC	dist to perch (ft)	7.7%			
%CC	------				
%CC	------				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Refer to individual lateral data sheets for shrub data. Average the mean of the individual shrub laterals.

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 33

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 33
Investigators: Ashley, Wagon

Covertype: Riparian Herb
Transect Type p-i
Unit of measure: feet
Interval: Ind.
Number of plots 10

	GPS COORDINATES		Mag AZ	Length
Start	325550	5086609	172	100
Turning Point				
Turning Point				
Turning Point				
End	325541	5086581	Total Length	100

Microplot Data: 10 **PLOTS NEEDED** 10 **PLOTS ENTERED** 0 **PLOTS BARE**
Microplot frame size:).10 m sq.
Plot interval: 10 ft
Mean Veg height 7.8 0.10 ft
% CC TOTAL 95.0%

			GRASS % CC	FORB % CC	EXOTIC %
%CC	Comp. grass	#DIV/0!			
%CC	dist to perch	#DIV/0!			
%CC	dist to escape	#DIV/0!			
%CC	------				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 39

Photo:

Field data:

Baseline data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 39
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 40

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: 40 PLOTS NEEDED 40 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 20.9 0.10 ft
% CC TOTAL 73.4%

		GRASS % CC	FORB % CC	EXOTIC % CC
%CC	dist to escape #DIV/0!			
%CC	diameter of escape #DIV/0!			
%CC	list between escap #DIV/0!			
%CC	dist to roost 0.0%			
		TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

COMPLEX RIPARIAN HABITAT TRANSECT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 39baseline
Investigators: Ashley, Ellis, Wilkinson
Number of points: 200
Height unit of measure: 0.10 ft

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Pt.				
Turning Pt.				
Turning Pt.				
End			Total Length	0

200 POINTS NEEDED **200** POINTS ENTERED

Species	N	% CC	Mean layer species height Layer 1	Layer 2	Layer 3	Layer 4		
persistant veg.	96	48.0%	56.77	0.00	0.00	0.00	0.10 ft	
bebbs willow	25	12.5%	125.56	128.57	0.00	0.00	0.10 ft	
eastern cottonwood	4	2.0%	125.00	150.00	0.00	0.00	0.10 ft	
russian olive	53	26.5%	160.96	120.00	0.00	0.00	0.10 ft	
Transect Layer Mean Height			117.07	132.86	0.00	0.00	0.10 ft	

89.0% COMBINED Canopy Cover
16.00% BARE POINTS
84.00% POINTS have 1 species
5.00% POINTS have 2 species
NO POINTS have 3 species
NO POINTS have 4 species

Habitats & Wildlife

Lateral data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 39 LATS
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 40

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: 40 PLOTS NEEDED 48 PLOTS ENTERED 1 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 6.0 0.10 ft
% CC TOTAL 56.7%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	% comp grass	37.3%			
%CC	dist to perch (ft)	26.5%			
%CC	------				
%CC	------				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

For shrub data refer to individual shrub lateral data sheets - must average the means of the four laterals.

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 40

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/21/05
Transect Number: 40
Investigators: Brandy

Covertype: Riparian Herb
Transect Type p-i
Unit of measure: feet
Interval: Ind.
Number of plots 8

	GPS COORDINATES		Mag AZ	Length
Start	325746	5086022	188	200
Turning Point				
Turning Point				
Turning Point				
End	325722	5085972	Total Length	200

Microplot Data: 8 **PLOTS NEEDED** 8 **PLOTS ENTERED** 0 **PLOTS BARE**
Microplot frame size: 0.10 m sq. **Mean Veg height** 10.6 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 97.5%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	#DIV/0!			
%CC	dist to perch	#DIV/0!			
%CC	dist to escape	#DIV/0!			
%CC	- - - - - -				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 41

Photo:

Field data:

Baseline data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 41
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 39

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: 39 **PLOTS NEEDED** 39 **PLOTS ENTERED** 0 **PLOTS BARE**
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 6.9 0.10 ft
% CC TOTAL 40.0%

		GRASS % CC	FORB % CC	EXOTIC % CC
%CC	dist to escape 150.0%			
%CC	diameter of escape 28.0%			
%CC	ist between escap 150.0%			
%CC	dist to roost 0.0%			
		TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

COMPLEX RIPARIAN HABITAT TRANSECT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 41baseline
Investigators: Ashley, Ellis, Wilkinson
Number of points: 200
Height unit of measure: 0.10 ft

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Pt.				
Turning Pt.				
Turning Pt.				
End			Total Length	0

200 POINTS NEEDED **200** POINTS ENTERED

Species	N	% CC	Mean layer species height Layer 1	Layer 2	Layer 3	Layer 4	
eastern cottonwood	7	3.5%	177.14	0.00	0.00	0.00	0.10 ft
bebbs willow	4	2.0%	120.00	0.00	0.00	0.00	0.10 ft
persistant veg.	109	54.5%	49.79	54.12	0.00	0.00	0.10 ft
weeping willow	5	2.5%	112.00	0.00	0.00	0.00	0.10 ft
corkscrew willow	4	2.0%	140.00	0.00	0.00	0.00	0.10 ft
peach leaf willow	7	3.5%	94.29	0.00	0.00	0.00	0.10 ft
russian olive	3	1.5%	86.67	0.00	0.00	0.00	0.10 ft
Transect Layer Mean Height			111.41	54.12	0.00	0.00	0.10 ft

69.5% COMBINED Canopy Cover
39.00% BARE POINTS
61.00% POINTS have 1 species
8.50% POINTS have 2 species
NO POINTS have 3 species
NO POINTS have 4 species

Habitats & Wildlife

Lateral data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 41 LATS
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 42

	GPS COORDINATES		Mag AZ	Length
Start	LAT E			300
Turning Point	LAT W			300
Turning Point	LAT N			300
Turning Point	LAT S			150
End			Total Length	1050

Microplot Data: 42 PLOTS NEEDED 42 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 25 ft
Mean Veg height 4.0 0.10 ft
% CC TOTAL 49.9%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	% comp grass	66.5%			
%CC	dist to perch (ft.)	22.4%			
%CC	------				
%CC	------				
		TOTAL %cc Grass	0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

For shrub %CC refer to individual shrub lateral data, average the mean of lateral transects

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 42

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 42
Investigators: Brandy, Mike

Covertype: Riparian Herb
Transect Type p-i
Unit of measure: feet
Interval: Ind.
Number of plots 10

	GPS COORDINATES		Mag AZ	Length
Start	325905	5085989	77	200
Turning Point				
Turning Point				
Turning Point				
End	325961	5085997	Total Length	200

Microplot Data: 10 PLOTS NEEDED 10 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: 0.10 m sq.
Plot interval: 20 ft
Mean Veg height 19.3 0.10 ft
% CC TOTAL 100.0%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	#DIV/0!			
%CC	dist to perch	#DIV/0!			
%CC	dist to escape	0.0%			
%CC	------				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 43

Photo:

Field data:

Baseline data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 43
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 40

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: 40 PLOTS NEEDED 40 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: 0.10 m sq. **Mean Veg height** 13.0 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 75.8%

		GRASS % CC	FORB % CC	EXOTIC % CC
%CC	dist to escape 150.0%			
%CC	diameter of escape 28.0%			
%CC	ist between escap 150.0%			
%CC	dist to roost 1.0%			
		TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

COMPLEX RIPARIAN HABITAT TRANSECT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 43baseline
Investigators: Ashley, Ellis, Wilkinson
Number of points: 200
Height unit of measure: 0.10 ft

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Pt.				
Turning Pt.				
Turning Pt.				
End			Total Length	0

200 POINTS NEEDED **200** POINTS ENTERED

Species	N	% CC	Mean layer species height Layer 1	Layer 2	Layer 3	Layer 4	
persistant veg	62	31.0%	47.57	48.63	30.00	0.00	0.10 ft
eastern cottonwood	13	6.5%	74.55	62.50	0.00	0.00	0.10 ft
russian olive	129	64.5%	205.66	60.00	0.00	0.00	0.10 ft
bebbs willow	1	0.5%	70.00	0.00	0.00	0.00	0.10 ft
Transect Layer Mean Height			99.45	57.04	30.00	0.00	0.10 ft

102.5% COMBINED Canopy Cover
9.00% BARE POINTS
91.00% POINTS have 1 species
11.00% POINTS have 2 species
0.50% POINTS have 3 species
NO POINTS have 4 species

Habitats & Wildlife

Lateral data

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 43 LATS
Investigators: Ashley, Wagon

Covertype: Riparian Shrub
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 40

	GPS COORDINATES		Mag AZ	Length
Start				
Turning Point				
Turning Point				
Turning Point				
End			Total Length	0

Microplot Data: **40** PLOTS NEEDED **47** PLOTS ENTERED **2** PLOTS BARE
Microplot frame size: **0.10 m sq.** Mean Veg height **6.0** 0.10 ft
Plot interval: **25 ft** % CC TOTAL **65.2%**

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	% comp grass	75.8%			
%CC	dist to perch (ft)	4.7%			
%CC	dist to roost (ft)	19.9%			
%CC	dist to escape (ft)	8.5%			
		TOTAL %cc Grass	0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

For lateral shrub %CC refer to individual shrub lateral transect data, average the mean of each transect lateral

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 44

Photo:

Field data:

SHRUB TRANSECT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 44
Investigators: Ashley, Wagoner, Wilkinson

Covertype: Shrub-steppe
Transect Type point intercept
Unit of measure: ft
Interval: 2 ft
Sample unit size: 100 ft
Height unit of measure: 0.10 ft

	GPS COORDINATES		Mag AZ	Length
Start	323710	5085959	214	150
Turning Pt.	323691	5085923	127	150
Turning Pt.	323695	5085873	214	100
Turning Pt.	323695	5085875	127	200
End	323729	5085825	Total Length	600

Shrub Intercept Data: 300 POINTS NEEDED 300 POINTS ENTERED 249 POINTS are BARE

Species	N	% CC	Mean height	s	%cc s	y	%cc y	m	%cc m	d	%cc d	vd	%cc vd	dd	%cc dd
big sage	44	14.7%	30.2	1	2.3%	1	2.3%	4	9.1%	17	38.6%	15	34.1%	6	13.6%
green rabbitbrush	6	2.0%	16.8	0	0.0%	0	0.0%	0	0.0%	1	16.7%	1	16.7%	4	66.7%
bitterbrush	1	0.3%	5.0	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%

AGE DISTRIBUTION	N	%
Seedling	1	1.96%
Young	1	1.96%
Mature	4	7.84%
Decadent	19	37.25%
Very Decadent	16	31.37%
Dead	10	19.61%

Overall Height	
MEAN	28.1
MODE	45.0
MAX	54.0
MIN	1.0
ST.DEV	16.1
TOTAL CC	17.0%

AGE KEY

Symbol	Meaning
s	seedling
y	young
m	mature
d	decadent
vd	very decadent
dd	dead

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 44
Investigators: Ashley, Wagon

Covertype: Shrub-steppe
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 24

	GPS COORDINATES		Mag AZ	Length
Start	323710	5085959	214	150
Turning Point	323691	5085923	127	150
Turning Point	323695	5085873	214	100
Turning Point	323695	5085875	127	200
End	323729	5085825	Total Length	600

Microplot Data: 24 PLOTS NEEDED 24 PLOTS ENTERED 1 PLOTS BARE
Microplot frame size: 0.10 m sq.
Mean Veg height 2.0 0.10 ft
Plot interval: 25 ft
% CC TOTAL 23.9%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	84.2%			
%CC	dist to perch	4.6%			
%CC	dist to escape	9.0%			
%CC	dist to roost	101.0%			
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 45

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 45
Investigators: Ashley, Wagon

Covertype: Shrub-steppe
Transect Type point intercept
Unit of measure: feet
Interval: Ind.
Number of plots 12

	GPS COORDINATES		Mag AZ	Length
Start	323619	5085499	250	300
Turning Point				
Turning Point				
Turning Point				
End	323514	5085498	Total Length	300

Microplot Data: 12 **PLOTS NEEDED** 12 **PLOTS ENTERED** 0 **PLOTS BARE**
Microplot frame size: 0.10 m sq. **Mean Veg height** 4.3 0.10 ft
Plot interval: 25 ft **% CC TOTAL** 86.8%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	#DIV/0!			
%CC	dist to perch	#DIV/0!			
%CC	dist to escape	19.2%			
%CC	diameter of escape	28.0%			
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Project:	Wanaket				Transect#:	45	Date:	23-Jun-05		Recorder	ashley, wagoner	
Sample	Species		Species		Species		Species		Species		Species	
Unit	russian olive											
	Intercept	Height	Intercept	Height	Intercept	Height	Intercept	Height	Intercept	Height	Intercept	Height
Sub Total	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!
Totals	1%	29	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!
Mean	0.2%	2.9	0.0%	#DIV/0!	0.0%	#DIV/0!	0.0%	#DIV/0!	0.0%	#DIV/0!	0.0%	#DIV/0!

Agency: Umatilla Tribe
Project Area: Wanaket
Transect: 52

Photo:

Field data:

MICROPLOT RESULTS

Area: Wanaket
Date of study: 06/22/05
Transect Number: 52
Investigators: Brandy, Mike, F

Covertype: Rip Forest
Transect Type p-i
Unit of measure: feet
Interval: Ind.
Number of plots 40

	GPS COORDINATES		Mag AZ	Length
Start	326272	5085546	213	70
Turning Point				
Turning Point				
Turning Point				
End			Total Length	70

Microplot Data: 40 PLOTS NEEDED 40 PLOTS ENTERED 0 PLOTS BARE
Microplot frame size: .10 m sq.
Plot interval: 25 ft
Mean Veg height 13.0 0.10 ft
% CC TOTAL 75.8%

			GRASS % CC	FORB % CC	EXOTIC % CC
%CC	Comp. grass	#DIV/0!			
%CC	dist to perch	#DIV/0!			
%CC	dist to escape	#DIV/0!			
%CC	------				
			TOTAL %cc Grass 0.0%	TOTAL %cc Forbs 0.0%	TOTAL %cc Exotic 0.0%

Habitats & Wildlife

Other parameters of this transect were taken by means of "ocular" assessment, refer to Transect summary sheet for more information.